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STEEL

ESTABLISHED 1882

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PRODUCTION • PROCESSING • DISTRIBUTION • USE

PRECISION PRODUCTION
. . . — *vital to* VICTORY

The swift and gigantic steps that American industry is taking in the program for national security are largely due to the *precision production* of metal parts. When the present emergency is ended, the record will show that one of the outstanding accomplishments was the production of defense material, not only in stupendous quantities but with each vital metal part repeatedly held to an extremely high standard of accuracy in size and finish. Today, in the midst of this emergency, Ex-Cell-O standard machine tools are performing numerous precision jobs in practically every industry engaged in defense work. They are taking an important part in making possible the speed and accuracy upon which success depends.

Illustrated here is an aircraft part being bored on Ex-Cell-O Precision Boring Machine (Style 112-C) with Ex-Cell-O Universal Fixture. Standard Ex-Cell-O Boring Machines are used extensively in production because of their ability to hold extreme accuracy in size and finish.

Picture below shows one of many precision parts being produced for airplanes on Ex-Cell-O Standard Thread Grinding Machines (Style 31 is shown here). Precision thread grinding is now universally employed in the production of all vital threaded parts used in aircraft.

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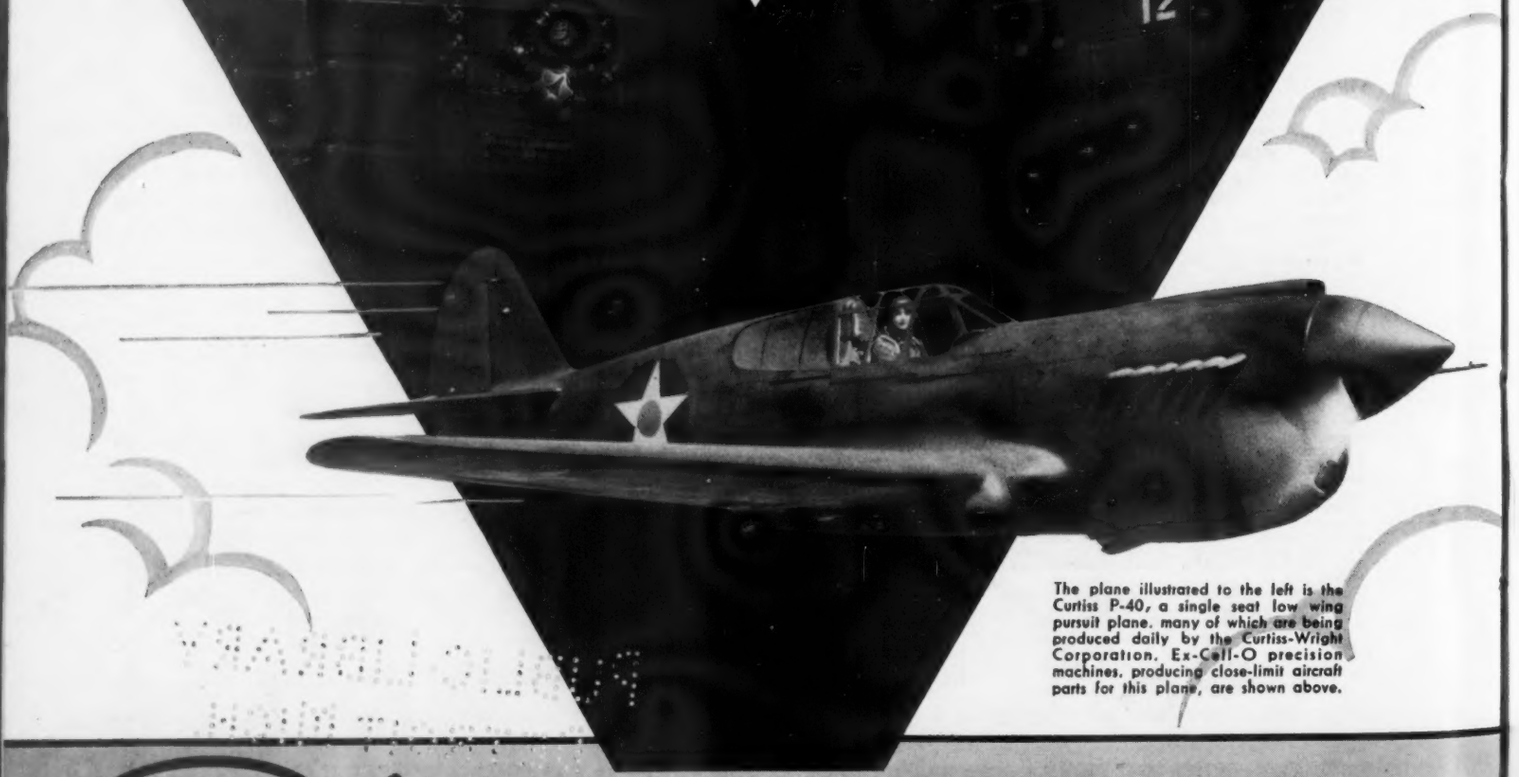


The plane illustrated to the left is the Curtiss P-40, a single seat low wing pursuit plane, many of which are being produced daily by the Curtiss-Wright Corporation. Ex-Cell-O precision machines, producing close-limit aircraft parts for this plane, are shown above.

XLO

Precision THREAD GRINDING, BORING AND LAPPING MACHINES, TOOL GRINDERS, HYDRAULIC POWER UNITS, GRINDING SPINDLES, BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS, PARTS

HIGHLIGHTING
THIS ISSUE OF
STEEL

■ WHILE steel production stood unchanged at 96 per cent of ingot capacity last week **(p. 27)**, at least five open hearth furnaces in Ohio and Pennsylvania were closed down for lack of scrap, with a critical situation developing at Chicago and Detroit. . . . At the very same time, the Supply Priorities and Allocations Board **(p. 21)** approved a program to expand existing ingot capacity by 10,000,000 tons—a program whose requirements will call for 1.3 per cent of the output of present facilities over the next two years; 30 companies submitted proposals and OPM has referred them to public financing agencies. . . . Analyzing the expansion program, Walter S. Tower **(p. 24)** questions its value to the present emergency.

. . .

Defense Sabotaged?

Many manufacturers, such as those making small hand tools **(p. 33)**, encounter grave difficulties in operating under the priorities system. STEEL invited a typical "small manufacturer" to express his criticisms in written form; he believes **(p. 29)** that the priorities system is "sabotaging defense." Some help to such companies may result from Donald M. Nelson's interpretation **(pp. 32 and 37)** of the rules governing inventory replenishment, also from the wider use of allocations. . . . OPM's Contract Distribution Division is organizing **(pp. 31 and 32)** a "flying squadron" of engineers, and opening additional district offices to help industries threatened with priorities unemployment.

. . .

Two Furnaces For Inland

Production of domestic mechanical refrigerators is being reduced 43.2 per cent **(p. 31)**. . . . Inland Steel Co. **(p. 24)** will build two government-owned blast furnaces. Prices on steel castings and on iron and steel out of warehouses **(p. 24)** will be under ceilings. . . . Lead **(p. 32)** is under full priority control. . . . Copper scrap **(p. 115)** is under full priority. . . . Scrap aluminum prices **(p. 32)** will be lowered. . . . The price schedule on used machine tools **(p. 33)** has been amended. . . . Not all OPM-PD forms and orders **(p. 25)** may be reproduced. . . . The nickel shortage **(p. 32)** is mounting further. . . . A new extra list **(p. 95)** applies to alloy steels. . . . Greater priority assistance is to be given to small distributors of certain steel products **(p. 33)** and to builders of specified machine tools.

. . .

The Garand Army Rifle

Professor Macconochie, in detailing the manufacture of the Garand semiautomatic rifle at Springfield armory, this week, **(p. 60)**, discusses early forms of light firearms, and procedures followed by the Ordnance Department in developing the present Army rifle. . . . Economies wire strapping affords both shipper and consignee are outlined by Adolph Larsen, **(p. 72)**. . . . Color matching by instrument according to F. H. Catlin and F. L. Michael, **(p. 85)**, besides simplifying the task, has entirely eliminated production line complaints. . . . A new machine, **(p. 86)**, finishes a brass shell case about three times faster than was possible in the last war.

. . .

More About Iron Powder

The much talked about subject of iron powder, this week, is again taken up by A. H. Allen, STEEL's Detroit editor, **(p. 58)**, who presented recently some notes on its production, use and future prospects at a conference on powder metallurgy at Massachusetts Institute of Technology. . . . R. F. Moyer describes, **(p. 68)**, how rotary swaging is utilized to apply shell bands, its effectiveness, and how the method lends itself to high production. . . . The part welding can play in "tailoring" proper bases for machine tools and power units is related by Walter J. Brooking, **(p. 76)**. . . . W. H. Ball, **(p. 80)**, details construction of a modern ingot stripper for handling today's steel plant molds.

99 YEARS

● Ninety-nine years means very little! Ninety-nine years of highly specialized experience in the steel business means a great deal; especially when that experience has involved handling huge quantities of steel, in thousands of kinds, shapes and sizes, and serving the varied needs of a host of users in every industry.

Ryerson *can* and *does* pledge that all of the skill and experience gained through 99 years of successful operation, always will vigorously be devoted to the interests of Ryerson customers. In the present period of steel shortage—as in similar periods in the past—the Ryerson organization is bending every effort to meet as nearly as possible every demand being made upon it.

Later, when American industry is back to normal production, the same organization will be working just as hard to provide steels of highest quality to meet every customer's requirement, and to provide them on the immediate basis which is synonymous with the name Ryerson.

We are glad to be 99! We are grateful for the past loyalty of our customers—but more grateful, perhaps, for their cooperation now, in our effort to serve them to the full limit of our resources. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON

OPM Studies Financing, Allocation of 10,000,000-Ton Steel Expansion

SPAB approves program to cost $1,250,000,000 to be completed in two years . . . Thirty companies submitted proposals for total increase of more than 13,000,000 tons of ingot capacity . . . Million tons steel required to build facilities

■ PROGRAM to expand steel ingot capacity by 10,000,000 tons annually, approved last week by the Supply Priorities and Allocations Board, will be allocated among 30 companies which have submitted proposals for adding more than 13,000,000 tons' capacity. The program was recommended in a report by W. A. Hauck, OPM steel consultant.

OPM officials are preparing immediate requests to federal financing agencies for funds to carry out the program, estimated to cost about $1,250,000,000 or $125 per ton of capacity added.

Jesse Jones, federal loan administrator, has said he believes the Reconstruction Finance Corp., through the Defense Plant Corp., would supply the bulk of the funds. Defense Plant Corp. in most cases will retain title to the facilities.

Mr. Jones said his organization has already concluded contracts for additional steelmaking capacity of 1,800,000 tons. Contracts with the United States Steel Corp. for proposed expansion have not yet been arranged, and he has not yet been able to get together with Bethlehem Steel Corp. for a loan.

The Hauck report reveals the program would make the West coast virtually independent of eastern mills for its steel supply, provided certain raw materials are made available. It would also eliminate supply deficiencies existing or in prospect in materials vitally important to defense, such as plates, rolled armor and alloy steels.

A breakdown of the recommendations shows that of the 10,000,000-ton proposed increase, 2,861,200 tons already is accounted for by 2,315,200 tons included in projects previously approved; by 462,000 tons included in proposals submitted and financed by companies and by 84,000 tons included in proposals submitted and financed by the Navy through EPF contracts. Of the balance of 7,138,800 tons, 5,465,300 tons would be allocated for such specific purposes as West coast expansion and increased production of important defense products. This would leave 1,673,500 tons to be allocated among various other programs described in the Hauck report as meritorious and needed.

W. A. Hauck

OPM steel consultant who prepared the report on feasibility of a 10,000,000-ton steel expansion, which was the basis for the program approved by SPAB. Mr. Hauck was assistant to the president, Lukens Steel Co., Coatesville, Pa., before joining the National Defense Advisory Commission last year. A graduate of Lafayette college, he formerly was assistant comptroller of Bethlehem Steel Co. and was associated with the George W. Goethals Inc. in management and engineering work. During NRA days, he served with the American Iron and Steel Institute in connection with the code for the iron and steel industry

Mr. Hauck's report said 1.3 per cent of the present capacity of the industry must be set aside during each of the next two years to build 10,000,000 tons of additional capacity. Total required is estimated at 1,000,000 tons.

Of the 10,000,000 tons of additional ingot capacity recommended without qualification, almost 3,000,000 tons have been approved previously and specifically by the OPM. The latter includes 2,135,200 for Carnegie-Illinois in the Pittsburgh district and 180,000 for Bethlehem at Sparrows Point, Md.

An additional 5,500,000 of the 10,000,000 tons is needed to meet certain shortages now existing and to make the West coast largely independent of eastern steel plants, the Hauck report said. The specific shortages mentioned include alloy steels for aircraft, tanks and tools; ordinary steel plate for ships, freight cars and boilers; armor plate for tanks, ships, gun mounts, hel-

mets, and planes; and bessemer steel, which can be made with a minimum of iron and steel scrap, to offset a shortage of scrap.

Tonnage of ingot capacity required to meet the above shortages would be divided as follows:

Alloy Steel	1,000,000
Bessemer Steel	1,000,000
Rolled Armor	100,000
Plates	1,000,000
West Coast	1,365,300
Balancing Facilities	500,000
	5,465,300

Steel companies have already submitted definite proposals for expansion of capacity by 13,118,768 tons, most of which would require government financing. Additional definite proposals running the total to 15,000,000 tons and more will be submitted by the companies shortly.

Financing has already been arranged or recommended for 2,861,200 tons and, from the other proposals pending and to be submitted, the OPM will select additional projects and recommend them to federal financing agencies as rapidly as possible.

Hauck estimated that it will cost up to $1,250,000,000 to increase capacity by 10,000,000 tons and at least $750,000,000 more for a further increase of 5,000,000 tons. In both cases, practically all of the money must be provided by government financing.

Cost Above Normal

Cost can be reduced and earlier production assured, the report said, by expanding facilities in existing plants wherever feasible. A flexible plan must be found promptly, it continued, to finance such projects in a manner recognizing that the additional facilities are being installed only because of the emergency, that their cost will be in excess of normal cost, and that they will not be self-liquidating.

Some of the 10,000,000 tons of new capacity can be completed within nine months, and substantially all of it within two years provided highest priority ratings are assigned to all undertakings. Unless such priorities are assigned, the report said, no further expansion should be started.

The further increase of 5,000,000 tons in capacity would be very difficult to obtain and would take up to three years to complete, the report continued, pointing out that the extra demands on suppliers of steel plant equipment would necessitate expansion of their plants, with consequent delays.

For strategic reasons, Hauck said, the West coast should be made substantially independent of eastern mills for its steel supply. Coupled with this finding was a statement that steel companies have proposed 1,865,000 tons of additional capacity in that area, including a new integrated plant proposed by the Bethlehem Steel Co. at Los Angeles and another new integrated plant proposed by the Columbia Steel Co., subsidiary of United States Steel Corp., at Pittsburg, Calif.

Western Stacks Considered

To supply pig iron for the Pittsburg plant and other West coast facilities, three blast furnaces are contemplated by Columbia Steel at Provo, Utah.

Additional capacity on the West coast can be obtained, the report said, if the necessary raw materials —such as iron ore and coking coal —can be provided. Possibilities in this field are being investigated.

The capacity proposed on the West coast is part of the 13,118,768 of definite expansion proposals already submitted to OPM by the steel companies. These proposals, most of which were submitted in response to an OPM request, may be grouped geographically as follows:

PROPOSED INCREASE IN CAPACITY BY STATES

States	Proposed Ingot Increase (Net Tons)	
(A) West of Rocky Mountains:		
California	1,725,300	
Oregon	60,000	
Washington	80,000	
Total		1,865,300
(B)		
Colorado	250,000	
Texas	242,948	
Total		492,948
(C) East of Rocky Mountains:		
Alabama	300,000	
Illinois (Excluding St. Louis area)	50,000	
Indiana	1,153,200	
Kentucky	144,240	
Maryland	300,000	
Michigan	428,800	
Missouri (Plus St. Louis area)	578,400	
New York	600,000	
Ohio	1,925,200	
Oklahoma	56,000	
Pennsylvania	5,224,680	
Total		10,760,520
Total West and East		13,118,768

Companies that have submitted proposals to increase ingot capac-

Proposed West Coast Steel Expansion Program

			Capacity Net Tons
(1) NEW SELF-CONTAINED STEEL PLANTS			
A. Los Angeles:			
Bethlehem Steel Co.			
Blast Furnaces	(2)	Pig Iron	864,000
Open Hearth Furnaces	(4)	Ingots	648,000
Electric Furnaces	(2)	Ingots	60,000
Finishing Mills		Carbon & Alloy Bars, Shapes, etc.	519,600
B. Pittsburg, Calif. (near San Francisco):			
Columbia Steel Co.			
Open Hearth Furnaces	(7)	Ingots	750,000
Foundry		Castings	44,100
Finishing Mills		Plates, Sheets, etc.	511,150
Electric Furnaces	(1)	Ingots	7,200
C. Provo, Utah:			
Columbia Steel Co.			
Blast Furnaces	(3)	Pig Iron	1,004,150
(2) EXPANSION OF EXISTING PLANTS			
A. Los Angeles Area:			
Columbia Steel Co.			
Open Hearth Furnaces	(1)	Ingots	60,000
Finishing Mills (capacity changes only)		Bars	12,000
B. San Francisco Area:			
Columbia Steel Co. (Pittsburg, Calif.)			
Open Hearth Furnaces	(2)	Ingots	120,000
Finishing Mills	(1)	Bars, Shapes, etc.	92,000
American Forge Co.		Heavy Forgings	
Pacific States Steel Co. (Niles, Calif.)			
Electric Furnaces	(4)	Heavy Forging Ingots & Bars	84,000
C. Seattle, Washington:			
Northwest Steel Rolling Mills			
Electric Furnaces		Ingots	32,000
Finishing Mills		Bars, etc.	27,000
Isaacson Iron Works		Heavy Forgings	
Pacific Car & Foundry Co.		Castings	21,600
D. Portland, Oreg.			
Oregon Electric Steel Rolling Mills, Inc.			
Electric Furnaces		Ingots	60,000
		Bars, Structural, etc	
E. Numerous other small programs also submitted.			

Summary of Increase in Ingot Capacity

	Tons Pig Iron	Tons Ingots—Open Hearth Furnaces	Tons Ingots—Electric Furnaces	Total
Bethlehem Steel Co.	864,000	648,000	60,000	708,000
Columbia Steel Co.	1,004,150	974,100	7,200	981,300
Pacific States Steel Co.			84,000	84,000
Northwest Steel Rolling Mills			32,000	32,000
Oregon Electric Steel Rolling Mills, Inc.			60,000	60,000
TOTAL TONS	1,868,150	1,622,100	243,200	1,865,300

ity and the proposed increases follow:

PROGRAMS RECEIVED FOR INCREASED INGOT CAPACITY

Company	Proposed Ingot Increase (Net tons)
American Rolling Mill Co.	384,240
Apollo Steel Co.	241,920
Bethlehem Steel Co.	2,772,000
Central Iron & Steel Co.	41,400
Colorado Fuel & Iron Co.	250,000
Continental Steel Corp.	30,000
Copperweld Steel Co.	66,000
Empire Sheet & Tin Plate Co.	151,200
Ford Motor Co.	178,800
Granite City Steel Co.	500,000
Henry Disston & Sons Co.	18,000
Inland Steel Co.	720,000
Ingersoll Steel & Disc. Co.	9,600
Jones & Laughlin Steel Corp.	976,200
Laclede Steel Co.	78,400
Lukens Steel Co.	350,000
National Steel Co.	250,000
Northwestern Steel & Wire Co.	50,000
Northwest Steel Rolling Mills	32,000
Oregon Electric Steel Rolling Mills	60,000
Otis Steel Co.	218,000
Pacific States Steel Co.	84,000
Phoenix Iron Co.	50,000
Pittsburgh Steel Co.	248,000
Republic Steel Corp.	1,450,000
Sheffield Steel Corp.	278,948
Texas Steel Co.	20,000
U. S. Steel Corp.	3,366,060
Wheeling Steel Corp.	100,000
Youngstown Sheet & Tube Co.	144,000
Total	13,118,768

In addition a number of companies have proposed additional facilities that do not include increases in ingot capacity. Among these companies are Wisconsin Steel Co., Chicago; Timken Roller Bearing Co., Canton, O.; Worth Steel Co., Claymont, Del.; and American Locomotive Co., New York. Addresses given are those of principal offices.

The expansion proposals which have been recommended and announced previously by the OPM as necessary parts of a 10,000,000-ton program include:

Date 1941	Description	Estimated Cost
June 25	Navy Speed-Up Program at Homestead and Duquesne, Pa., (Carnegie-Illinois Steel Corp.) comprising big expansion in armor plate and heavy forgings capacity	$ 84,950,000
July 2	Additional pig iron capacity 6,508,950 tons	176,370,000
Sept. 12	Supplemental	22,862,000
Sept. 12	Supplemental	9,580,000
	Total	308,812,000
July 28	High speed plate mill, Bethlehem Steel Co., Sparrows Po.nt. Md., Plant	23,097,000
Aug. 13	25 Ore Boats	50,000,000
	Total approved by OPM to 9/12/41	$336,859,000

Steel ingot capacity as of June 30, 1941, was 86,143,700 tons. It is estimated that upon the completion of 3,028,948 tons now under way and not included in the expansion program under consideration, ingot capacity will be approximately 89,000,000 tons. On top of this capacity the 10,000,000-ton expansion would raise total capacity to 99,000,000 tons per year, and an expansion of 15,000,000 tons would provide a total capacity of 104,000,000 tons. Current ingot production is at the rate of 84,000,000 a year.

Sufficient blast furnaces were recommended by Hauck to produce the additional pig iron that will be needed, in view of the shortage of iron and steel scrap, to operate the expanded ingot capacity. Construction of more lake ore boats, in addition to the 25 already recommended to the Maritime Commission, will also be necessary.

Furthermore, the report said, Lake ore is not economically located for all points of ore consumption and explorations are now being made in all other warranted iron ore areas to determine what new bodies of ore will be opened up.

It was estimated that at least 50,000 men would be employed in building 10,000,000 tons of steel capacity and at least 75,000 men in a 15,000,000 ton expansion.

Operation of 10,000,000 tons of capacity would require at least 75,000 men and to operate 15,000,000 tons 100,000 employes would be required.

Ten-Million-Ton Expansion "May Come Too Late", Declares Tower

■ BECAUSE of the limiting supply of raw materials which are essential to the making of steel, any further expansions of steelmaking capacity may be "largely doomed to a considerable period of ineffectiveness," Walter S. Tower, president, American Iron and Steel Institute, said at the annual convention of the Farm Equipment Institute, in Chicago, last Thursday.

Mr. Tower stated that annual steel capacity was being expanded this year by 4,000,000 tons and that the total may top 89,000,000 tons by the early part of 1942. That will bring capacity 22,000,000 tons above actual output in the year of 1940.

Materials Limit Output

An actual output, however, at the rate of 85,000,000 tons a year is about the best that it is safe to hope for over the next 18 months, because of the limiting supply of scrap and ore needed for the steel furnaces.

For this reason, he continued, the proposed 10,000,000-ton expansion program may come too late to have any value in the present problem, since the peak of the defense program demands for steel will probably be reached in 1942, or at latest in early 1943.

"Of the 10,000,000-ton program it is extremely doubtful whether any measurable effect could be expected before the midde of 1944, if then, because of the physical limitations imposed by the steps necessary to get supplies of metallics and ore-carrying facilities.

"Nevertheless, companies in the steel industry have repeatedly assured defense officials of their whole-hearted co-operation in any reasonable expansion of steelmaking capacity in the furtherance of the defense program."

Mr. Tower said that practically all those studying the problem agree that an actual physical shortage of scrap was in sight. "To offset this, supplies of pig iron must be increased substantially if the present steelmaking capacity is to be fully employed. For this reason, a program has been worked out between members of the industry and representatives of the OPM which would provide facilities capable of producing about 6,500,000 tons of pig iron annually. This program would also involve the production of 11,000,000 tons of additional iron ore, and the building of 16 or more ore-carrying boats for service on the Great Lakes.

"Completion of the boats is likely to be the limiting factor in full realization of that program, as competent opinion holds that they cannot be ready before the opening of the 1943 season for ore movement.

"Men in the industry who are well qualified to judge believe that such an expansion of blast furnace activity will do little, if any, more than make up for progressive worsening of the scrap position, and thus will serve mainly to keep steel production approximately up to the level which present capacity would permit. Such pig iron expansion does not hold out any definite prospect of providing steelmaking iron for any new steel ca-

pacity that might be requested by administration sources as a part of the so-called 10,000,000-ton expansion program."

Certain factors were at work, Mr. Tower said, which ought probably to ease the situation in respect to steel supply.

"It is not unreasonable to look for a letdown from the excessive buying of consumers' goods in various durable and semidurable lines, which has been going on this year. Tax prospects are likely to help in that direction.

"Still more important is the earnest effort of the Steel Branch of the OPM actually to come to grips with the facts of the problem. A real factual appraisal of defense requirements for steel has recently been ordered and is now under way. When it is finished a dense fog of uncertainty, which has hung over defense requirements, will be dispelled."

"Ceiling" To Be Placed on Steel Distributors' Prices, Henderson Says

WASHINGTON

■ Leon Henderson announced last week that in the near future all iron and steel products sold through jobbers, dealers and distributors will be brought under a price ceiling which he said is "necessary to halt profiteering by certain members of the trade."

The new schedule he indicated will cover sales of seconds and rejects as well as prime products. Upon the promulgation of this order OPA will have established maximum prices for iron and steel products sold in any quantity by mills, warehouses, jobbers, distributors, dealers, agents or brokers and products to be included under the new ceiling will be the same as those covered by price schedule No. 6 which set maximums for iron and steel sold by primary producers.

"Since the issuance of price schedule No. 6 which froze producers' prices at first quarter levels," Mr. Henderson said, "the principal steel jobbers have co-operated admirably with this office to keep prices in the proper relation to mill prices set by the schedule. In recent months, however, largely because of the great demand for steel generated by the defense program, certain members of the trade have demanded exorbitant prices from manufacturers in urgent need. Numerous complaints have reached my office citing cases where consumers in need of steel have been compelled to pay prices ranging from 50 per cent to 200 per cent above those generally quoted.

"In many instances seconds and rejects have been sold at prices considerably higher than those charged for steel of first grade. This is profiteering pure and simple, and must be stopped."

About 85 per cent of all iron and steel, he explained, is now being sold by steel mills directly to consuming industries. The remainder is bought by jobbers, distributors and dealers for resale and it is estimated 11,800,000 net tons of iron and steel are being thus distributed during 1941 against 6,686,000 net tons in 1940.

In 1940, Mr. Henderson said, jobbers, dealers and distributors resold 54 per cent of the entire production of iron and steel pipe and tubes, 41 per cent of all wire and wire products and slightly over 46 per cent of all galvanized sheets in addition to important quantities of tool and alloy steels. The steel distribution trade buys in carload lots of 40,000 pounds direct from the mill at base prices and resales are made in any quantity with price differentials based on the poundage involved.

It is estimated that over 5000 companies, partnership and individuals are in the iron and steel distribution business in the United States.

Inland To Operate Two New Government-Financed Blast Furnaces

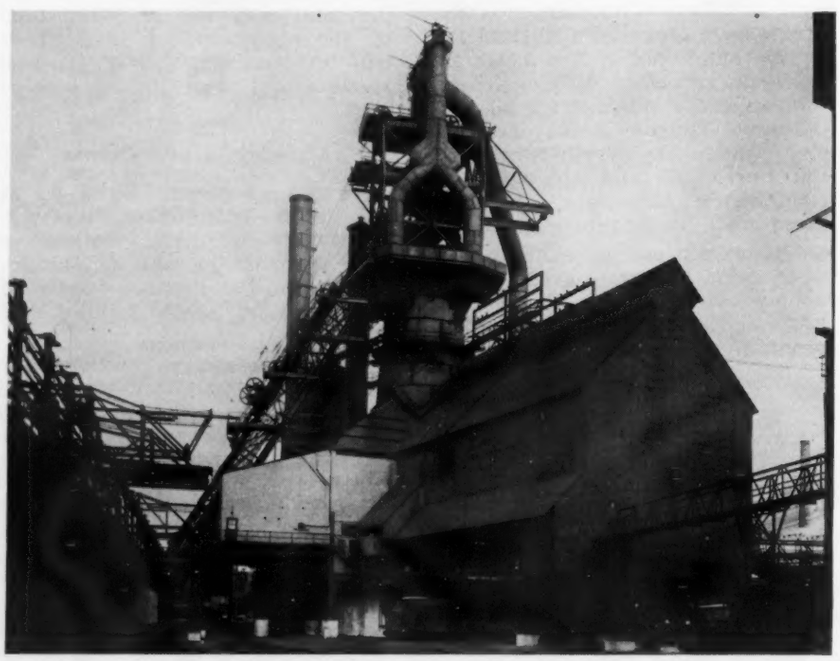
■ Inland Steel Co., Chicago, last week signed a contract with Defense Plant Corp. for new facilities to be built at East Chicago, Ind., as a part of the national defense program.

The project, according to government report, will cost approximately $34,000,000.

Plan involves construction of two blast furnaces having an estimated pig iron capacity of 900,000 tons per year, with the supporting coke ovens, by-product plant, docks, and auxiliary equipment.

Plant will be paid for and owned by Defense Plant Corp., with Inland acting as the agent for the government in the carrying out of the construction program. Inland will receive no compensation whatever for its services. When plant is completed, it will be leased to Inland for operation.

Inland has no option to purchase the plant at the conclusion of the emergency. A definite site has not yet been purchased. It will be adjacent to the present Inland plant, but outside the boundaries of that plant, so that at the close of the emergency it will constitute a self-contained unit which the government may dispose of on the best terms obtainable.



Work of preparing plans and specifications is reported under way.

Accompanying photo shows Inland's Madeline No. 5, a 1000-ton unit lighted Jan. 3, 1939.

September Daily Average Pig Iron Production at New Peak; Rate 99.4%

■ DAILY average production of coke pig iron in United States in September reached a new peak at 157,510 net tons as the operating rate climbed two points to 99.4 per cent of capacity from the revised rate of 97.4 per cent in August. Stacks in blast at the end of the month totaled 219, a net gain of four, according to reports from operators of the nation's 229 potential blast furnaces. Production was estimated for two small producers.

Up 3167 tons or 2 per cent from 154,343 tons in August, average in the month was 13.2 per cent greater than 139,085 tons produced daily in September last year. It compared with daily average of 127,604 tons in the month in 1937 and 130,534 tons in September, 1929.

Total output in September, 4,725,292 net tons, was down 59,347 tons or 1.2 per cent from August, and compared with 4,766,216 tons in July. Third highest monthly output on record, it was 13.2 per cent greater than in September, 1940.

Combined output in the first nine months this year, 41,339,819 tons, was 23.4 per cent above the period in 1940 and was nearly double 22,861,142 tons, aggregate for the first three quarters in 1939. It compared with production of 33,944,521 tons in the first nine months of 1937 and was up 13 per cent from 36,582,224 tons in the period in 1929.

Average daily production in the nine months was 151,428 tons, 23.3 per cent greater than in the period last year. It compared with 83,740 tons in the period January-September, 1939, with 124,340 tons in the first nine months of 1937, and 134,000 tons in the period in 1929.

Operating rate, based on revised capacity total of 57,830,610 net tons recently published by the American Iron and Steel Institute Inc., compared with revised rates of 97.4 per cent in August, 97 per cent in July, and 95.7 per cent in June. Revision was as of June 30, 1941. In September last year, rate was 91.5 per cent, 69.7 per cent for the month in 1939 and 83.7 per cent in September, 1937.

Merchant iron produced in the month, 731,184 tons, was 15.5 per cent of total output, and compared with 15.4 per cent in August, 15 per cent in July, 14.9 per cent in June and 13.2 per cent in September, 1940.

Total of stacks active at the end of the month was highest for any month since June, 1929, when 220 were in blast and production was 4,160,917 tons. In August, 215 were blowing, 212 in July and 211 in June. Total in September last year was 192, and 169 for the month in 1939; in September, 1937, 181, and 204 in the month in 1929.

Two merchant furnaces were added in the month and none blown out. In the steelworks or nonmerchant classification, one was blown out and three added. Stacks blown in during the month:

In Alabama: Tuscaloosa, Tennessee Coal, Iron & Railroad Co., at Holt. In Illinois: One Granite City, Koppers United Co. In Maryland: Sparrows Point E, Bethlehem Steel Co. In Ohio: Ohio No. 2, Carnegie-Illinois Steel Corp. In Pennsylvania: Colonial, Riddlesburg Iron Co.

Brier Hill No. 2 stack of Youngstown Sheet & Tube Co., in Ohio, was blown out.

Ten furnaces were out of blast Sept. 30. Several have been reported in process of rehabilitation, and are scheduled to be lighted soon. These include: One Detroit, National Steel Corp.; one Granite City, Koppers United Co.; Carrie No. 4, Carnegie-Illinois Steel Corp., and the stack blown out last month.

Following furnaces, many years idle, have not yet been definitely reported in active process of repair: Two Joliet and two Edgar Thomson stacks, Carnegie-Illinois Steel Corp.; Delaware, Philadelphia Electric Co.; and Cumberland, Warner Iron Co.

Two Rockwood stacks, recently purchased by Tennessee Products Corp. and blown in during August, were not previously reported relighted.

Toledo B furnace, Interlake Iron Corp., was blown out for relining Oct. 1.

PIG IRON STATISTICS

RATE OF FURNACE OPERATION
(Relation of Production to Capacity)

	1941[1]	1940[2]	1939[3]	1938[4]
Jan.	95.5	85.4	51.0	33.6
Feb.	95.3	75.0	53.5	33.6
March	96.3	69.5	56.1	34.2
April	91.8	68.9	49.8	33.4
May	94.1	74.2	40.2	29.4
June	95.7	83.6	51.4	25.5
July	97.0	86.1	55.0	28.2
Aug.	97.4	89.9	62.4	34.8
Sept.	99.4	91.5	69.7	40.5
Oct.	....	94.2	85.2	48.0
Nov.	....	96.4	90.3	55.0
Dec.	....	96.4	88.5	51.4

[1] First six months are based on capacity of 57,503,030 net tons, Dec. 31, 1940—last six months on capacity of 57,830,610 net tons, June 30, 1940; [2] capacity of 55,628,060 net tons, Dec. 31, 1939; [3] capacity of 56,222,790 net tons, Dec. 31, 1938; [4] capacity of 56,679,168 net tons, Dec. 31, 1937. Capacities by American Iron and Steel Institute.

MONTHLY IRON PRODUCTION
Net Tons

	1941	1940	1939
Jan.	4,666,233	4,024,556	2,436,474
Feb.	4,206,826	3,304,368	2,307,405
March	4,702,905	3,270,575	2,680,446
April	4,340,555	3,139,043	2,301,965
May	4,596,113	3,497,157	1,923,625
June	4,551,040	3,813,092	2,373,753
July	4,766,216	4,060,513	2,638,760
Aug.	4,784,639	4,234,576	2,979,774
Sept.	4,725,292	4,172,551	3,218,940
Tot. 9 mo.	41,339,819	33,516,431	22,861,142
Oct.	.....	4,437,725	4,062,670
Nov.	.....	4,397,656	4,166,512
Dec.	.....	4,542,864	4,219,718
Total	.....	46,894,676	35,310,042

SEPTEMBER IRON PRODUCTION
Net Tons

	No. in blast last day of Sept.	No. in blast last day of Aug.	—Total Tonnages— Merchant	—Total Tonnages— Non-merchant
Alabama	19	18	119,445	189,292
Illinois	20	19	112,957	369,436
Indiana	19	19	22,145	521,136
New York	15	15	114,793	193,270
Ohio	47	47	154,415	911,996
Penna.	73	72	172,791*	1,322,192*
Colorado	3	3		
Michigan	4	4		
Minnesota	2	2	14,413*	191,179*
Tennessee	3	3		
Utah	1	1		
Kentucky	2	2		
Maryland	6	5		
Mass.	1	1	20,225*	295,607
Virginia	1	1		
West Va.	3	3		
Total	219	215	731,184*	3,994,108*

*Includes ferromanganese and spiegeleisen.

AVERAGE DAILY PRODUCTION
Net Tons

	1941	1940	1939	1938
Jan.	150,524	129,825	78,596	52,201
Feb.	150,244	113,943	82,407	52,254
March	151,707	105,502	86,465	53,117
April	144,685	104,635	76,732	51,819
May	148,262	112,811	62,052	45,556
June	151,701	127,103	79,125	39,601
July	153,749	130,984	85,121	43,827
Aug.	154,343	136,599	96,122	54,031
Sept.	157,510	139,085	107,298	62,835
Oct.	.....	143,152	131,053	74,697
Nov.	.....	146,589	138,883	85,369
Dec.	.....	146,544	136,119	79,943
Ave.	151,428	128,128	96,740	57,962

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WASHINGTON

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Steel for Sale in August 6.7 Per Cent Over July

■ Steel produced for sale in August totaled 5,573,666 net tons, 347,564 tons or 6.7 per cent more than 5,226,102 tons in July, according to the American Iron and Steel Institute, New York.

Exports in August were 516,540 tons, 86,047 tons more than 430,493 tons in July, a gain of 19.9 per cent. Shipments to other members of the industry for further conversion totaled 339,679 tons, 32,187 tons or 10.5 per cent more than 307,492 tons in July.

August production was 924,601 tons greater than 4,649,065 tons in August, 1940, up 19.9 per cent. Details for the month are presented in the accompanying table.

Production in eight months this year totaled 42,749,649 tons, compared with 29,516,435 tons in the corresponding period of 1940, an increase of 44.8 per cent. During 1940 the companies included below represented 97.6 per cent of total output of finished rolled steel products.

1940	Output	Exported	Pct. Exported
Sept.	4,446,555	951,555	21.4
Oct.	4,937,388	783,652	15.87
Nov.	4,760,948	562,587	11.82
Dec.	4,909,448	713,802	14.5
Year	48,584,860	7,683,858	15.8
1941			
Jan.	5,163,912	558,198	10.8
Feb.	4,864,936	560,035	11.5
March	5,411,319	491,519	9.07
April	5,269,748	331,942	6.29
May	5,444,235	317,442	5.8
June	5,086,210	327,357	6.4
July	5,226,102	430,493	8.2
Aug.	5,573,666	516,540	9.3

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

August - 1941 (Period)

		Number of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Current Month: Per cent of capacity	Current Month: Shipments: Export	Current Month: Shipments: To members of the industry for conversion into further finished products	Year to Date: Total	Year to Date: Per Cent of capacity	Year to Date: Shipments: Export	Year to Date: Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	38	1	xxxxxxxx	670,638	xxx	251,026	169,149	4,292,092	xxx	1,108,639	1,375,044
	Heavy structural shapes	9	2	5,126,200	390,888	89.8	11,443	xxxxxxxx	3,057,942	89.6	122,682	xxxxxxxx
	Steel piling	4	3	422,000	34,062	95.0	4,422	xxxxxxxx	238,645	84.9	22,378	xxxxxxxx
	Plates—Sheared and Universal	21	4	6,323,370	535,693	99.7	17,378	4,102	3,759,137	89.3	230,637	23,950
	Skelp	8	5	xxxxxxxx	78,219	xxx	11,808	33,343	689,334	xxx	114,120	284,270
	Rails—Standard (over 60 lbs.)	4	6	3,613,600	132,360	43.1	3,110	xxxxxxxx	1,200,754	49.9	48,826	xxxxxxxx
	Light (60 lbs. and under)	6	7	302,800	11,276	43.8	5,266	xxxxxxxx	117,880	58.5	44,512	xxxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	102,000	2,161	24.9	424	xxxxxxxx	18,080	26.6	2,475	xxxxxxxx
	Splice bar and tie plates	15	9	1,300,200	54,192	49.1	347	xxxxxxxx	496,751	57.4	10,917	xxxxxxxx
	Bars—Merchant	40	10	xxxxxxxx	505,263	xxx	25,637	57,942	4,259,351	xxx	327,823	513,202
	Concrete reinforcing—New billet	17	11	xxxxxxxx	148,517	xxx	15,726	xxxxxxxx	995,343	xxx	138,579	xxxxxxxx
	Rerolling	19	12	xxxxxxxx	22,369	xxx	1,783	xxxxxxxx	144,483	xxx	10,199	xxxxxxxx
	Cold finished—Carbon	22	13	xxxxxxxx	103,236	xxx	2,099	xxxxxxxx	832,066	xxx	15,959	xxxxxxxx
	Alloy—Hot rolled	19	14	xxxxxxxx	150,531	xxx	4,073	21,408	1,278,483	xxx	110,700	189,376
	Cold finished	17	15	xxxxxxxx	16,866	xxx	1,649	xxxxxxxx	122,503	xxx	21,842	xxxxxxxx
	Hoops and baling bands	5	16	xxxxxxxx	13,910	xxx	398	xxxxxxxx	79,573	xxx	2,738	xxxxxxxx
	TOTAL BARS	61	17	12,724,365	960,692	88.9	51,365	79,350	7,711,802	91.0	627,840	702,578
	Tool steel bars (rolled and forged)	17	18	164,895	13,772	98.3	666	xxxxxxxx	97,376	88.7	5,222	xxxxxxxx
	Pipe and tube—B. W.	14	19	2,109,200	153,015	85.4	8,390	xxxxxxxx	1,091,734	77.7	81,247	xxxxxxxx
	L. W.	8	20	885,260	46,895	62.4	2,026	xxxxxxxx	331,951	56.3	21,150	xxxxxxxx
	Electric weld	5	21	491,020	48,907	117.2	991	xxxxxxxx	335,020	102.5	14,233	xxxxxxxx
	Seamless	13	22	2,963,690	192,776	76.6	14,069	xxxxxxxx	1,412,004	71.5	132,277	xxxxxxxx
	Conduit	8	23	176,145	14,048	93.9	338	xxxxxxxx	105,858	90.3	3,032	xxxxxxxx
	Mechanical Tubing	10	24	386,975	29,326	89.2	2,023	xxxxxxxx	225,746	87.6	17,303	xxxxxxxx
	Wire rods	20	25	xxxxxxxx	138,693	xxx	29,192	20,197	1,019,580	xxx	122,903	175,493
	Wire—Drawn	40	26	2,321,900	202,452	102.6	9,370	2,296	1,500,956	97.1	99,748	14,852
	Nails and staples	19	27	1,132,610	62,826	65.3	3,907	xxxxxxxx	536,296	71.1	48,040	xxxxxxxx
	Barbed and twisted	16	28	462,210	20,270	51.6	4,234	xxxxxxxx	184,998	60.1	41,363	xxxxxxxx
	Woven wire fence	15	29	746,185	23,106	36.4	282	xxxxxxxx	216,541	43.6	1,538	xxxxxxxx
	Bale ties	11	30	110,970	7,574	80.3	-	xxxxxxxx	55,935	75.7	141	xxxxxxxx
	All other wire products	7	31	39,280	2,008	60.2	3	xxxxxxxx	13,869	53.0	3	xxxxxxxx
	Fence posts	13	32	136,195	5,551	48.0	131	xxxxxxxx	49,916	55.0	726	xxxxxxxx
	Black plate	12	33	343,635	40,603	139.1	3,219	-	285,471	124.8	26,479	43
	Tin plate—Hot rolled	7	34	515,620	40,779	93.1	9,231	xxxxxxxx	210,666	61.4	27,073	xxxxxxxx
	Cold reduced	11	35	3,527,040	319,012	106.5	28,399	xxxxxxxx	1,998,124	85.1	184,477	xxxxxxxx
	Sheets—Hot rolled	28	36	xxxxxxxx	585,967	xxx	19,425	14,387	5,067,395	xxx	204,945	148,453
	Galvanized	15	37	xxxxxxxx	135,364	xxx	6,518	xxxxxxxx	1,150,972	xxx	76,900	xxxxxxxx
	Cold rolled	17	38	xxxxxxxx	242,091	xxx	6,886	xxxxxxxx	2,142,368	xxx	48,657	xxxxxxxx
	All other	14	39	xxxxxxxx	69,192	xxx	2,419	xxxxxxxx	535,680	xxx	16,127	xxxxxxxx
	TOTAL SHEETS	31	40	13,160,830	1,032,614	92.4	35,248	14,387	8,896,415	101.5	346,629	148,453
	Strip—Hot rolled	24	41	3,211,580	146,622	53.7	5,530	16,855	1,343,077	62.8	52,196	170,126
	Cold rolled	36	42	1,443,355	106,303	86.7	1,255	xxxxxxxx	827,792	86.1	12,163	xxxxxxxx
	Wheels (car, rolled steel)	5	43	422,825	21,477	59.8	687	xxxxxxxx	168,103	59.7	1,124	xxxxxxxx
	Axles	5	44	480,350	18,620	45.6	400	xxxxxxxx	123,767	38.7	2,029	xxxxxxxx
	Track spikes	11	45	327,275	13,711	49.3	360	xxxxxxxx	116,840	53.6	2,385	xxxxxxxx
	All other	4	46	32,100	2,525	92.6	-	xxxxxxxx	19,197	89.8	79	xxxxxxxx
	TOTAL STEEL PRODUCTS	155	47	xxxxxxxx	5,573,666	xxx	516,540	339,679	42,749,649	xxx	3,576,586	2,894,809
	Pig iron, ferro manganese and spiegel	27	48	xxxxxxxx	689,193	xxx	45,623	209,398	5,357,894	xxx	379,866	1,538,002
	Ingot moulds	4	49	xxxxxxxx	69,176	xxx	485	xxxxxxxx	498,880	xxx	2,790	xxxxxxxx
Iron Products	Bars	12	50	166,195	8,528	60.4	146	305	63,573	57.4	624	2,970
	Pipe and tubes	3	51	109,300	6,461	69.6	225	xxxxxxxx	44,584	61.3	1,782	xxxxxxxx
	All other	2	52	71,000	2,898	48.0	828	-	14,247	30.1	2,508	-
	TOTAL IRON PRODUCTS (ITEMS 50 to 52)	14	53	281,995	17,887	74.7	1,199	305	122,404	65.2	4,914	2,970

Total Number of Companies Included - 173

The estimated average yield of products for sale from ingots produced by the companies included above is 71.1 *%, which applied to their total ingot capacity equals* 59,563,800 *net tons of finished rolled products. Production for sale, less shipments to members of the industry for further conversion, related to the estimated yield is as follows:*

Current month 5,233,987 *N. T.;* 103.4 *%*

Year to date 39,854,840 *N. T.;* 100.5 *%*

Employment in Steel Industry Continues Rise

■ Employment in the steel industry rose during August to an average of 654,000 men, the sixteenth consecutive monthly increase since April, 1940, during which time a total of 151,000 new employes was added, according to the American Iron and Steel Institute.

In July, 648,000 were employed, compared with 560,000 in August, 1940, and 503,000 in April, 1940.

Total payrolls of $112,757,000 were disbursed to steel company employes in August, against $114,059,000 in July, and $83,837,000 in August, 1940.

Wage-earning employes received an average of 98.5 cents per hour in August, compared with 99.1 cents in July, and 85.1 cents in August, 1940.

The number of hours worked per week by wage earners averaged 37.2 in August; 37.8 in July and 36.7 hours per week in August, 1940.

17,000 Return After Strike At Tennessee Coal & Iron

■ Strike of 17,000 SWOC employes of Tennessee Coal, Iron & Railroad Co. in Alabama was ended Sept. 28 when the unionists agreed to return to work if state guardsmen were withdrawn.

The unauthorized walkout occurred Sept. 26 when 4500 employes at Ensley quit work in protest against "grievances."

State guardsmen were ordered to the Ensley plant and the strike spread to other TCI units.

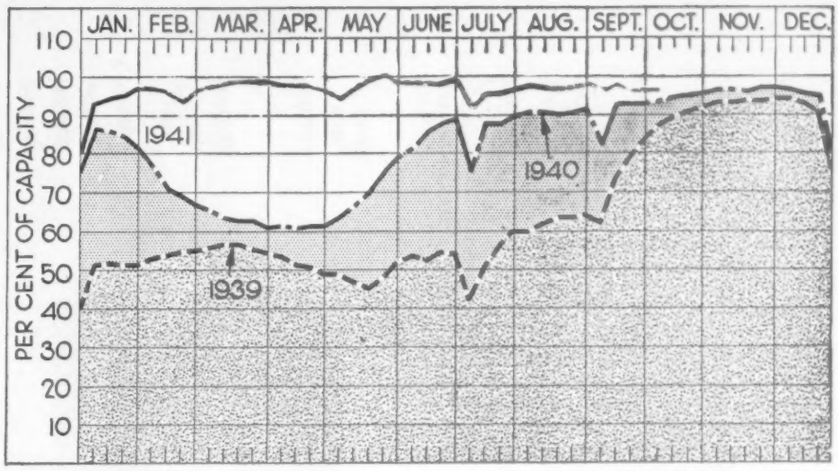
A union spokesman said SWOC would ask for negotiation of the grievances as soon as the men returned to work.

Can Company Affiliates To Build Torpedoes

■ Torpedoes for the United States Navy will be produced by the American Can Co. in a large new plant in the Chicago area. Negotiations are said to have been under way for the last month to obtain a 45-acre factory site on which a plant to cost several millions will be built by the Defense Plant Corp. and leased to the company.

A new Delaware company, known as the Amertorp Corp., has been registered at Springfield, Ill. President is Maurice J. Sullivan, New York, president, American Can Co. Secretary is Richard A. Burger, Harrison, N. J., secretary-treasurer, American Can Co. Capital is given as $250,000.

Operations are expected to start soon after Jan. 1.



PRODUCTION . . . . Steady

■ PRODUCTION of open hearth, bessemer and electric furnace ingots last week was unchanged at 96 per cent. Four districts gained, four declined and four showed no change. A year ago the rate was 93½ per cent; two years ago it was 87½ per cent.

Youngstown, O.—With 77 open hearths and three bessemers in production the rate remained at 98 per cent. Youngstown Sheet & Tube Co. has blown out a furnace at Brier Hill plant and Republic Steel Corp. will shut down an open hearth for this week.

Chicago—Advanced ½-point to 101½ per cent, 1 point below the all-time record of last spring. Five of the six plants are at 100 per cent or better. Wisconsin Steel Co. has placed in operation the second of its two new open hearths at South Chicago. Capacity is increased 160,000 tons annually.

Birmingham, Ala.—Held at 95 per cent with 23 open hearths in production.

Cincinnati—Declined 2 points to 81 per cent, with five open hearths idle.

St. Louis—Dropped 8 points to 83 per cent, four open hearths being out for repairs.

Detroit—Gain of 2 points to 89 per cent resulted from an additional open hearth being lighted. Maintenance of this rate depends on scrap supply, which is low.

Central eastern seaboard—Off 1 point to 94 per cent.

Buffalo—Under pressure to make deliveries steelmaking continues at 90½ per cent.

Cleveland—Addition of an open hearth raised the rate 2 points to 97½ per cent.

Pittsburgh—Production was held steady at 98 per cent last week, with the same rate scheduled for this week.

Wheeling—Gained 3 points to 94 per cent by return of idle open hearths.

New England—While production last week was at 83 per cent, 7 points lower, a rebound is expected this week.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Oct. 4	Change	Same week 1940	Same week 1939
Pittsburgh	98	None	87.5	83
Chicago	101.5	+ 0.5	97.5	86
Eastern Pa.	94	— 1	92	64
Youngstown	98	None	85	90
Wheeling	94	+ 3	97	93
Cleveland	97.5	+ 2	88	89
Buffalo	90.5	None	90.5	83.5
Birmingham	95	None	97	86
New England	83	— 7	88	100
Cincinnati	81	— 2	90	84
St. Louis	83	— 8	82.5	72
Detroit	89	+ 2	94	100
Average	96	None	93.5	87.5

Machine Tool Industry's Work Week Highest

■ Eighty-five per cent of the country's machine tool plants are operating their key departments from 100 to 168 hours per week to speed production of machine tools for national defense, the National Machine Tool Builders' Association reports.

Average work-week per man throughout the machine tool industry was reported as 49.4 hours, the highest in American industry, according to the National Industrial Conference Board.

Since the defense emergency began, according to the association's report, 72 new sources for machine tools have been developed and in addition 36 machine tool manufacturers have subcontracted complete machines. This represents a substantial addition to the country's machine tool capacity.

MEN of INDUSTRY

■ **THOMAS TOBY** has been named eastern district sales manager for Pittsburgh Screw & Bolt Corp., Pittsburgh, after having served several years as sales representative of the New York office. His headquarters are in the International building, 630 Fifth avenue, New York.

♦

Charles R. Pollock was recently appointed Detroit-Toledo, O., district manager for Sentry Co., Foxboro, Mass., and will be located at 7450 Melville avenue, Detroit. Sentry business in Florida will be handled by **Charles R. Bringman,** 310 East Orlando avenue, Orlando.

♦

Dr. H. A. Jones has been named sales manager of General Electric electronic tubes for nonradio applications in industry. The GE industrial tube division has been transferred from the special products section of the industrial department to the radio and television department. Dr. Jones had been manager of the special products section since 1929.

♦

J. E. Johnson has resigned as vice president, Muskegon Piston Ring Co., Muskegon, Mich., and as manager of its Muskegon plant, but will continue as a member of the board of directors. He will devote his time to Air Control Products Inc., Muskegon, of which he is treasurer and a director.

♦

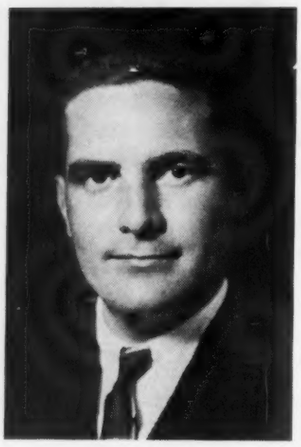
John F. McKernan, until recently chief of equipment in OPM's production division, has returned to Western Electric Co., New York, as defense program planning manager. He will co-ordinate production on the company's $100,000,000 defense job and will integrate defense manufacture with output of telephone apparatus for the Bell System. **George R. Logan,** associated briefly with Mr. McKernan in Washington, and previously in the Western Electric organization, will serve as his assistant.

♦

Wallace W. Lockwood has been appointed advertising manager, Taylor Instrument Companies, Rochester, N. Y., to replace **Elmer E. Way,** recently resigned.

♦

N. J. Clarke, vice president in charge of sales, Republic Steel Corp., Cleveland, has been elected



Thomas Toby

president, Republic Supply Co., Houston, Tex., a wholly-owned subsidiary of the former. **A. B. Judd,** vice president of Republic Supply, was elected vice president and general manager; **J. H. Brooks,** vice president; and **J. H. Lollar Jr.,** secretary and treasurer.

♦

Duane Brice has been promoted to assistant treasurer, Plomb Tool Co., Los Angeles.

♦

J. Louis Reynolds, vice president and general sales manager, Reynolds Metals Co., Richmond, Va., has been inducted president general, United States Flag Association.

Louis B. Neumiller

Whose election as president, Caterpillar Tractor Co., Peoria, Ill., was announced in STEEL, Sept. 29, page 28. Mr. Neumiller, associated with Caterpillar since 1915, succeeds B. C. Heacock, who was elected chairman of the executive committee

♦

J. Silverman has been named purchasing agent, Eagle Electric Mfg. Co., Brooklyn, N. Y., to succeed **N. Schwartz.**

♦

George L. Hubbell has been appointed midwestern sales engineer for Porcelain Enamel Mfg. Co., Baltimore. He formerly served as district sales manager for Globe Wernicke Co., Cincinnati, and for E. F. Hauserman Co., Cleveland.

♦

Paul M. Janko has been appointed sales manager, Moslo Machinery Inc., Cleveland, and will continue to cover the Pittsburgh area for the company. **R. C. Burton** was recently added to direct advertising and sales promotion.

♦

O. J. Pearre has been named arc welding specialist in the Philadelphia district office of General Electric Co., Schenectady, N. Y., succeeding **W. A. Terry,** recently transferred to general sales work. Associated with GE since 1931, Mr. Pearre will have charge of electric welding sales along the Atlantic seaboard, including Philadelphia, Pittsburgh, and Norfolk, Va.

♦

John W. Melrose, Olympia, Wash., has been appointed, by the Chicago, Milwaukee, St. Paul & Pacific railroad, to the newly created post of geologist. He will make surveys of industrial use of mineral deposits, metallic and nonmetallic, to assist in search or expansion of mineral developments.

♦

George E. Munschauer has been elected treasurer, and **Elmer D. Heinz,** secretary, Niagara Machine & Tool Works, Buffalo. Both Mr. Munschauer and Mr. Heinz have been associated with the company many years in executive capacities.

♦

Fred S. Doran, Cleveland manager, Joneph T. Ryerson & Son Inc., Chicago, has temporarily taken over some of the duties of **W. F. Kurfess,** vice president, who, as reported in STEEL, Sept. 29, page 29, has been ordered to active duty in the United States Navy. **J. P. McGough** will serve as manager of the Cleveland office.

Why I Believe Defense Is Being "Sabotaged"

By A SMALL MANUFACTURER

■ **The editors of STEEL, after hearing many complaints from small manufacturers as to the threats to their business due to the priorities system, asked a typical small manufacturer to write an article setting forth his viewpoint.**

This manufacturer produces a product small in size and essential to the processing operations in many industries. The product is an assembly of metal parts which are cast, forged and stamped. The opinions expressed are those of the author and not necessarily those of the editors.

IS THE defense program being sabotaged?

This question should be given serious consideration. I believe the answer is: Intentionally, no. Unintentionally, perhaps yes.

Tune in on the conversation of our really front-line men in the defense program—I mean those men who are directly responsible for the procurement and production — and whether it be at the lunch table, locker room or even over the conference table, you will find the principal topic of conversation is not "How Can We Increase Our Production," but "Priorities."

Almost without exception these men display an enthusiasm and determination to put the defense plan over. They feel that our entire philosphy is on trial and this determination causes them heartily to resent anything which retards or interferes with their efforts. Without a doubt, the No. 1 complaint is the priority system.

In discussing the priority system, I have yet to hear the first complaint against any of the personnel of the OPM or other government agencies. On the contrary, the field men are, without exception, courteous, cooperative and sympathetic to the problems of industry. Unfortunately, their function is largely that of an umpire with a bad set of rules.

Burdened with Details

Few people outside of industry have any conception of the number of executives and key men whose time is either wholly or partially occupied today with priority problems at the expense of production and engineering problems, which are being neglected.

Few people realize the full implications of how the paper work increases by geometric progression through the extension of priority certificates. One manufacturer compares the priority system with the classic case of the man who went to work for one cent the first day and doubled his pay daily until at the end of the month he was receiving a fabulous sum.

Another compares it with an inverted pyramid.

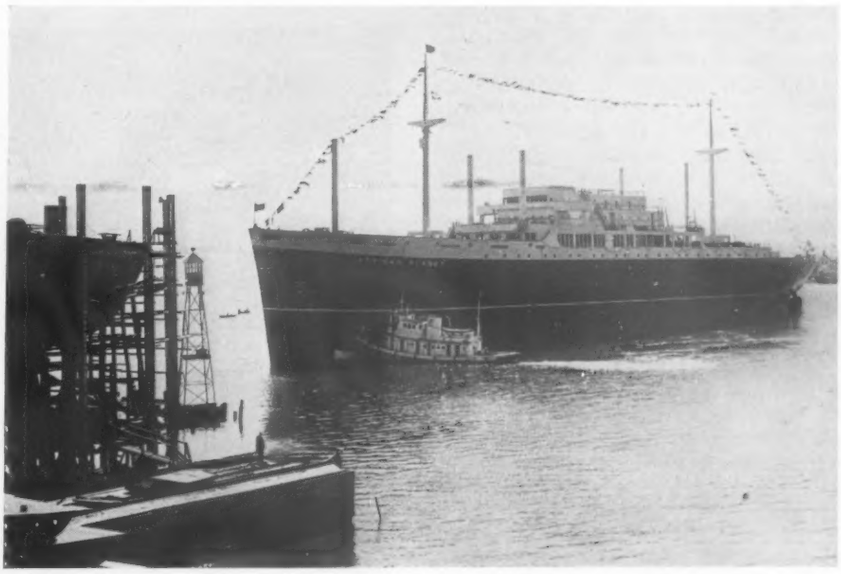
Another uses a more concrete illustration. "Suppose Company A receives a prime contract carrying a high priority. In order to secure production material, equipment, etc., it issues 500 extensions. We will say that Company B receives one of these extensions covering perhaps 10 different items. Company B then breaks its extension down and re-extends it to 10 different manufacturers of whom Company C is one. Company C's share happens to be only $50. However, this is divided among its suppliers of iron castings, forgings, stainless steel, bronze, etc., averaging only $5 per item.

Company C is unable to place orders for $5 with the foundry. In fact, Company B is most reluctant to extend a $50 priority to him at all. Company C therefore fills the order but is unable to replace its stock. He has a mass of small orders, some with priorities, some going to defense plants but without priority extensions. His inventory is soon exhausted, he can not secure materials and in desperation he begins to insist upon priorities; the top men in the organization become so engrossed in handling the details and trying to thresh them into line that they are forced to neglect the more important phases of their business.

Here is just a typical illustration:

My company manufactures industrial controls which are used only in industrial plants, central power stations, etc. In running through our orders, we see a predominance of the large chemical companies, powder plants, steel companies, public utilities, navy yards, shipyards, ordnance plants. It is distinctly an industrial product and cannot be used on baby buggies or bridge tables. Although our sales are not large, our equipment is most vital to the operation of these plants. As our product is rather highly special-

One of 14 Launched in a Day



■ **In the largest mass launching of merchant ships since the first World War, 14 vessels left the ways of American yards Sept. 27—seven on the Pacific coast, six on the Atlantic and one on the Gulf. Shown above is the S. S. AFRICAN PLANET, 17,000-ton all-welded combination passenger and cargo liner, just after being launched at Pascagoula, Miss., yards of Ingalls Shipbuilding Corp.**

ized, a substantial part of our selling effort consists of engineering service. One of our men compares our product to the spark plug of an automobile, without which the car could not operate. Many of our orders are for emergency breakdowns, where vital manufacturing equipment is affected, consequently we must be prepared to make almost immediate shipment.

To make this product, our company must assemble parts of iron, steel, bronze, stainless steel, and so on in the form of castings, forgings, bolts, stampings, etc. All of these metals are under priority.

My company sells about 80 per cent of its product through some 85 or 90 distributors located all over the United States and Canada. These distributors are mill supply houses and engineering sales organizations.

We are 100 per cent enthusiastic about the defense program and for anything that will help it. We are equally opposed to anything which delays or confuses the issue and certainly the priority system appears to be doing this. We have spent years building up a nice business with those industries which are now working largely on defense.

Cites Examples

Our business has been built up largely on service. This consists of giving engineering information and emergency deliveries. Our equipment produces nothing. It merely is an accessory or control, without which the actual production equipment cannot operate. A $50 piece of equipment of our manufacture could tie up a $50,000 machine. When we get an S.O.S. from one of these plants, are we expected to sit back and wait for two or three weeks until a priority certificate is in our hands? Not on your life; that part goes out just as fast as we can get it out, priority or no priority, and in about 95 per cent of the cases we never do get the priority.

In our files you will find plenty of orders from powder plants, arsenals, navy yards, construction quartermasters, steel plants, etc. etc., on which no priority was ever received. Sure, we have asked for them, but what purchaser is going to all the trouble of issuing a priority on $100 or less, particularly when the material has already been received and installed? We are going to continue to take care of these plants which we know are important defense projects, just as long as we can buy, borrow or steal the material.

Whoever planned the priority system had a good basic idea. Whoever planned the paper work must have started life as a chain letter-writer. We've got some pretty smart fellows in our organization who can figure out the most complicated engineering problems, but this priority business has stopped them cold. We would like to follow the rules to the letter but don't know how, and haven't found anyone else who does. Ask five different men about some particular point and you'll get as many different opinions. Four of them must be wrong, but which one is right?

Take Preference Order P-22 covering emergency repairs. When this first came out, every one breathed a big sigh of relief and figured that this was just the thing needed to eliminate a lot of this silly red tape. On the surface it simplified things a lot but when you got into it, it was a different story. First, we understand that this applies to emergency repairs but does not apply to maintenance. Just try to distinguish between the two and see where you land!

If the roof is leaking and you patch it up, it's emergency repairs. If you put the patch on before the rain actually starts, it's maintenance.

Another thing—these P-22 orders are all supposed to be filed separately and kept for inspection for two years. We wonder if they realize just what that involves to an already overloaded organization? In the first place, it would take three months to get a new set of file cabinets and by the end of three months your filing department would be more confused than now.

The local OPM office warned us not to accept any P-22 orders unless the qualifying clause was right on the order word for word. So far we haven't received a single order properly worded except those that we sent back and told them what to write.

Since this P-22 ruling came out on Sept. 9 we believe there have been two or three important changes. When you analyze these regulations you can see that they sound all right in theory but not enough thought has been given to making them work. Henry Ford is reported to have said that many engineers could design a beautiful engine that would do everything except run. I don't want to be over-critical, but I do feel that this situation is the most serious bottleneck in the whole defense setup.

After all of this inventory of the weaknesses of the system, must we admit there is no solution? Certainly not! Unfortunately, the word which we must use has a stigma which will be difficult to overlook. The word is "Dictator."

Almost every successful enterprise, business, political or social, has had a dictator at its head. The basis of all military operations is Supreme Command. It appears that Mr. Hitler replaced the European system of bureaucracy with that of individual responsibilities and made it work.

Most successful businesses are under the command of one man whose decisions are final. He is selected for his ability to make these decisions and is held strictly accountable for them. The Chief Executive of this country has repeatedly indi-

(*Please turn to Page* 116)

Cuban Scrap for American Defense

■ **"Friends of the Americans Association" in Cuba load 70 tons of scrap iron aboard freight cars to be shipped to America to be converted into defense weapons. The association has been conducting a scrap metals collection campaign throughout the island. Associated Press photo**

Windows of *WASHINGTON*

More engineers assigned to help convert civilian plants to defense material manufacture . . . 175,000 tons of steel to be saved annually by ceiling on domestic refrigerator output; other scarce material also to be conserved . . . Rules governing use of inventories issued by Priorities Division . . . Small distributors of certain merchant steel products granted relief, in quotas and priority ratings

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ "FLYING SQUADRON" of 50 engineers to determine whether industries threatened with priorities unemployment can be converted to defense production will be established immediately, according to Floyd B. Odlum, Director of the Contract Distribution Division of OPM.

Mr. Odlum made the announcement at the organization meeting of the Engineering Advisory Committee he established last week to assist the division in speeding up defense production and relieving priorities unemployment by spreading defense work.

Members of the committee agreed to help the division obtain the forces of 50 qualified engineers immediately. This staff will supplement engineering forces already maintained by the division in Washington and in the field, visiting communities or whole industries where the Labor division of OPM finds that severe unemployment exists or is threatened due to shortage of material for nondefense work.

Cases in which the engineers find that plants can be converted to defense production will be certified to the War and Navy Departments and the United States Maritime Commission with recommendations that suitable defense orders be placed with these firms.

Mr. Odlum told the committee that the number of priorities unemployment cases now being investigated by the Labor and Contract Distribution Divisions for certification represented "only a flea bite" compared with the total number expected in coming weeks.

The committee organized to give the Contract Distribution Division continuing assistance in many fields of activity.

George S. Armstrong, George S. Armstrong & Co., New York, president of the Association of Consulting Management Engineers Inc., is chairman of the group. Members include Edwin G. Booz, Chicago; John M. Carmody, administrator, Federal Works Agency; Wallace Clark, New York; Walter W. Colpitts, New York; Morris L. Cooke, Labor Division, OPM; Harry Arthur Hopf, New York; William S. Ford, Milwaukee; J. R. Lotz, New York; Herbert G. Moulton; Edmund A. Prentis, New York; George T. Trundle Jr., Cleveland; D. J. Walsh Jr., New York; John A. Willard, Boston; Ellwood Horton, New York; Mr. McCrell, New York; H. G. Crockett, New York; R. K. Blanchard, American Society of Mechanical Engineers; Dr. M. Ittner, Jersey City, N. J., and Charles H. Cogan, American Society of Electrical Engineers.

Highspots of the Week's Washington News

Refrigerator production for the last five months this year reduced 43.2 per cent from average monthly sales for the 12 months ended June 30 by OPM.

Aluminum scrap price ceiling will be lowered approximately 2 cents a pound Nov. 1.

Flying squadron of 50 engineers to study conversion of plants from civilian to defense production.

Priorities Division opens 11 new field offices; total now is 27.

Preference ratings for repair and maintenance not applicable to property outside United States; cannot be used to develop new gas pools.

Copper scrap placed under full priority control.

Distributors of certain merchant steel products granted priority assistance by OPM Iron and Steel Section directive.

Preference Rating Order P-11, machine tools, amended and extended as P-11-a.

Nickel preference order extended to March 31.

Form PD-1, application for ratings, may be reproduced.

Laboratories' applications for A-2 rating must be directed to Chemical Branch of Priorities Division.

All lead supplies placed under full priority control.

Refrigerator Output Reduced 43.2% for Five-Month Period

Production of domestic mechanical refrigerators for the five months beginning Aug. 1 has been reduced by 43.2 per cent of average monthly factory sales for the year ended June 30 last by OPM Priorities Division.

Order L-5 is based on recommendations by the Division of Civilian Supply looking to an output of 2,007,000 units in the 12 months beginning Aug. 1, 1941, as against 3,670,000 units produced in the 12 months ended June 30, 1941.

Anticipated 12-month program represents a decline of 45.5 per cent from output in the 12 months ended June 30, 1941, and 20 per cent from output in the 12 months ended June 30, 1940. However, it is higher than output in most other years since 1929.

Estimated demand for refrigerators to replace those wearing out during the coming year is 700,000 units. Anticipated production will

cover this by a wide margin and still leave a substantial number of refrigerators for new installations.

Program is designed to reduce consumption of steel in the manufacture of refrigerators by 175,000 tons a year, to effect substantial savings in consumption of other scarce materials, to help relieve the pressure on material supplies from consumers' durable goods industries, and to release facilities for defense work.

Because it is believed the larger manufacturers are better able to withstand a reduction than the smaller ones, the reduction has been graduated. For the last five months of 1941, makers who sold an average of 16,000 units a month must cut 45 per cent; builders selling between 5000 and 16,000 are to cut 37 per cent; manufacturers selling up to 5000 units are reduced 29 per cent.

To avoid possible inequities, provision was made by the Priorities Division that the larger manufacturers may produce not more than 50,400 units during the five-month period, or adopt the 45 per cent curtailment, whichever will give the greater output. Likewise medium-size manufacturers may choose between the 37 per cent reduction or a ceiling of 17,750 units.

Nickel Allocation Order Extended to March 31

The United States faces a nickel shortage for 1941 of about 40,000,000 pounds, the OPM Priorities Division said last week. Next year it is expected that the shortage will go higher, perhaps as high as 60,000,000 or 70,000,000 pounds. Because of this prospect, the division issued General Preference Order M-6-a, extending priority control over nickel to March 31, 1942.

In the new order it is provided that the Director of Priorities, as heretofore, will continue to allocate primary nickel among competing consumers. The allocations of nickel are made each month after examination of proposed shipments and apparent requirements.

Amends Price Schedule for Second Hand Machine Tools

Price Schedule No. 1, secondhand machine tools, was amended and reissued last week. Originally promulgated Feb. 17, the amended issue substitutes the name of OPA for the title of Price Stabilization Division of the National Defense Advisory Commission includes a definition of rebuilt and guaranteed used machine tool in line with previous interpretations of the schedule, and includes a supplement issued May 7 designating March 1, 1941, as the base date for computing prices of second hand tools.

Nelson Rules on Use of Inventory Materials

Interpretation relating to the use of inventory materials to fill purchase orders bearing preference ratings, and limiting the circumstances under which preference ratings may be used by a supplier to obtain needed materials was issued last week by Priorities Director Nelson. The director set forth the following points:

1—A producer who has received a defense order, may not use a preference rating to procure materials with which to manufacture the defense articles ordered if his inventory is already large enough to let him fill the order and still leave him with a practicable working minimum inventory.

2—If a producer's inventory is below a practicable minimum inventory, he may use a preference rating to procure the needed materials if this use of the preference rating is authorized. In such a case, however, he must not delay manufacture of the defense articles until he has received the materials.

3—If a producer fills a defense order out of inventory materials without himself using a preference rating to obtain needed materials, he may not, after completion of the order, obtain materials to replenish inventory by use of a rating.

Complete Priority Control Extended to All Lead Supplies

All supplies of domestic and imported lead were placed under full priority control last week in General Preference Order M 38, which also sets up an allocation system.

Total defense and civilian requirements were said to have created a shortage of domestically produced lead. Current consumption is approximately 960,000 tons a year. Current production, including that from foreign ores, is not expected to exceed 600,000 tons a year. The difference must be made up from scrap and imported lead.

Estimated tonnages of lead now available annually are: Domestic ores, 470,000 tons; foreign ores, 130,000 tons. Foreign pig lead available: From Mexico, 150,000 tons a year; Canada, 96,000 tons; Australia, 48,000 tons; Peru, 42,000 tons. Total available from domestic and foreign ores, from imports and from scrap is 1,086,000 tons.

All foreign pig lead is now being purchased by the Metals Reserve Co. and allocated by OPM.

Purpose of the M-38 order is to extend similar control to domestic lead and formalize the action through the Director of Priorities.

Main points in the order: Refiners and dealers in lead must file with the Priorities Division not later than the twentieth day of each month a schedule of proposed shipments for the following month. After Oct. 1, when specified, each refiner is required to set aside for a special pool an amount to be fixed periodically; lead from this pool will be allocated directly by the Priorities Division. In shipping the remainder of production, refiners must give preference to defense orders. All lead released by the Metals Reserve Co. will be allocated by the Priorities Director.

Aluminum Scrap Price Ceiling To Be Lowered

Present maximum prices of aluminum scrap and secondary aluminum ingot will be reduced as of Nov. 1 to reflect the reduction from 17 cents to 15 cents a pound in the price of primary aluminum on Oct. 1 by OPA.

Decision was reached after careful examination of the supply situation by OPA and consultation with trade members and the OPM. By bringing secondary metal prices into line with that of primary aluminum, it is believed that use of the former by defense industries, as desired by defense authorities, will be facilitated. Thus, the pressure on primary supplies will be reduced.

Price reductions in scrap and secondary aluminum, Mr. Henderson stated, will approximate 2 cents a pound on the several grades covered by the schedule, but to effect appropriate readjustments, the cuts in some cases will slightly exceed 2 cents and in other instances will be somewhat less than 2 cents.

The readjustments will reflect experience accumulated by OPA in actual operation of the schedule, as well as changes in the scrap situation since the ceiling was originally announced on March 24. Quantity differentials on scrap will also be introduced into the schedule, according to present plans.

Eleven New Field Offices Opened by Priorities Division

Eleven new field offices have been opened by the OPM Priorities Division of the Office of Production Management, Director Nelson announced. Mr. Nelson also revealed John D. Pollock will head the priorities field service office in New York. Mr. Pollock replaces Philip M. McCullough, who has been named as priorities co-ordinator for the eastern area.

Priorities division field service of-

fices now number 27. They are under the supervision of L. Edward Scriven, director, priorities field service. Addresses of the new offices and the names of the district managers follow:

Indianapolis, Circle Tower building, Albert O. Evans.

Minneapolis, Rand Tower building, Willard F. Kiesner.

Portland, Oreg., Bedell building, J. Fred Bergesch.

Salt Lake City, Utah, Utah Oil building, Ralph E. Bristol.

Houston, Tex., Federal Reserve Bank building, George L. Noble Jr.

Buffalo, M & T Bank building, Paul R. Smith.

Jacksonville, Fla., Hildebrandt building, George H. Andrews.

Charlotte, N. C., Liberty Life building, J. E. MacDougall.

Baltimore, Baltimore Trust building, Theodore M. Chandlee.

Richmond, Va., Federal Reserve Bank building, Fred P. Wilmer.

San Antonio, Tex., 415 West French place, Carl L. Pool.

New Priority Aid Given Machine Tool Builders

New priority assistance has been given to nearly 500 builders of specified machine tools going into defense channels. The aid is contained in Preference Rating Order P-11-a, a limited blanket rating order, to be used in obtaining material "for the production of metalworking equipment." It replaces P-11 which expired Sept. 30 and contains certain changes.

Main points in the new order are:

1—Ratings of A-1-a, A-1-b, and A-1-c are assigned to producers of metalworking equipment, the rating depending on the urgency of the need involved for the equipment being produced.

2—A producer granted the use of such a blanket rating may use it only to obtain certain materials specified in Exhibit A, attached to the order; he may obtain these materials only for the production of certain specified machine tools listed in the order assigned him; and he may, in any event, use the rating only to obtain materials for the production of defense orders as defined.

3—A producer may extend the rating to a supplier, and a supplier, subject to the terms of the order, may also extend the rating to his source of supply.

4—A producer, but not a supplier, may use the rating to obtain maintenance and shop supplies as well as material actually entering into production.

Metalworking equipment covered by the terms of the order includes many types of machine tools and equipment, such as grinding machinery, drilling and tapping machines, chucks, gages, measuring tools, jigborers, presses, planers and many others.

In each case, however, the rating assigned to any one producer may be used only for the production of the machine or machines specified in the individual order.

Exhibit A to P-11-a

Motors and other electrical accessories.

Alloy and carbon steels in bars, forgings, castings, plates, sheets, shapes and tubes.

Ferrous and nonferrous castings.

Machine parts and accessories.

Cutting tools, including cemented carbides.

Abrasives.

Measuring instruments and gages.

Brass, copper and steel tubing and fittings.

Oil resisting hose.

Paints, lacquers and finishing materials.

Maintenance and shop supplies—this item applies to a producer's requirements only and is restricted to materials necessary for proper operation and maintenance of a producer's manufacturing equipment and facilities.

Foundry supplies consisting of steel rail and other steel scrap, silvery pig iron, regular pig iron, coke, ferrosilicon, ferromanganese, vanadium, nickel, molybdenum, and chromium.

Small Dealers in Merchant Steel Products Granted Aid

A program to aid small distributors of certain merchant steel products, including those jobbers and hardware dealers who are warehousers within the terms of M-21-b, was formulated last week by the Iron and Steel Section of the Priorities Division.

The plan is based on a formula which will govern shipments of the merchant products listed to steel warehouses during the months of October, November and December. It is set forth in a directive which lists certain steel products widely sold by warehouses and stipulates the quantities of those products which may be delivered to them during the coming calendar quarter.

The order governing steel warehouses defines a warehouse as "any person who receives physical delivery of steel from a producer for sale or resale in the form received." This definition includes certain hardware stores, dealers and jobbers who buy from producers. These small business firms, therefore, will be able to get the merchant products listed—such as wire and nails—with the assistance of the plan.

In all cases covered, the rated shipments to be made in the October-December period are lower than the quantities shipped by the same producers to the same warehouses for the similar period of 1940, although total shipments to the warehouses may be as high as 110 per cent of 1940 shipments if higher deliveries do not conflict with the fulfillment of defense orders by producers. In other words, the shipments facilitated by a preference rating are lower than those received by the warehouses in 1940 but higher shipments can be made if the material is available.

The rated shipments permitted under the directive will carry ratings of A-9.

The formula announced in the directive applies only to shipments of the so-called merchant products listed. Quotas for the delivery of other steel warehouse products are now being prepared and will be distributed to the industry within a short time.

Major purpose of the steel warehouse plan is to provide assistance to the thousands of warehouses which perform an important service in the distribution of small quantities of steel to all kinds of customers, many of them engaged in defense work. These warehouses had been experiencing some difficulty in obtaining adequate supplies, but the new plan grants definite quotas so that these distributors may receive the products they need.

Products included in the plan and the percentage of 1940 shipments eligible for A-9 rating are:

Hot-rolled concrete reinforcing bars (unfabricated), 80 per cent.

Pipe and tubes (all kind except mechanical and pressure tubing), 80 per cent.

Wire and wire products, including fence posts (includes wire, woven wire fence, barbed wire, nails and staples, bale ties, fence posts and gates), 70 per cent.

6 Per Cent Profits Ceiling Goes "By the Board" for '41

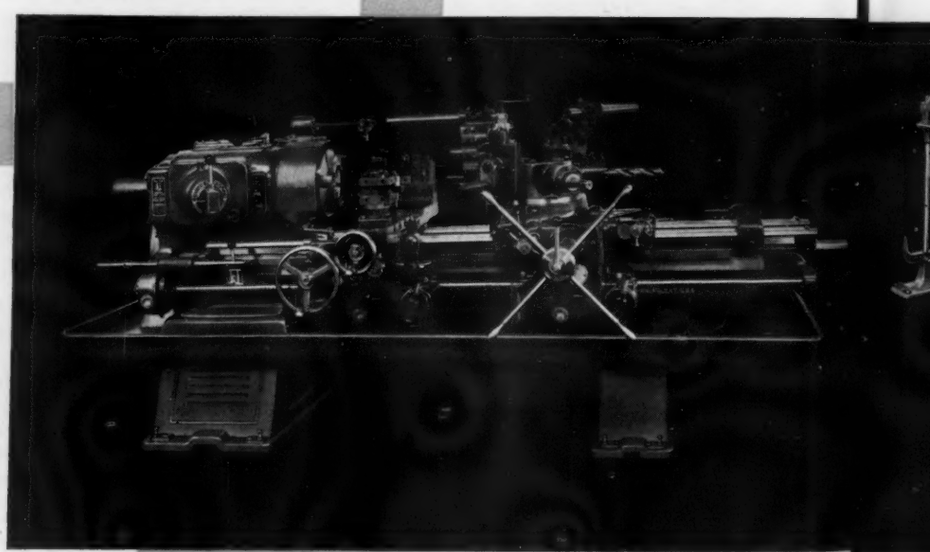
Although Secretary of Treasury Morgenthau still is insisting on a 6 per cent ceiling on corporate profits for the duration of the emergency, such action will not apply to 1941 earnings, it was disclosed last week.

Mr. Morgenthau's proposal was attacked by Donald M. Nelson, executive director of SPAB, and by Marriner S. Eccles, chairman of the Federal Reserve Board, on the ground that industry needs an incentive to productivity and efficiency.

Treasury Department officials have hinted that if such a bill is presented for 1942, special allowances may be made to small business men.

LEMUEL HEDGE

UNTIL 1818, sheets and blank books had been lined by hand, but in that year Lemuel Hedge built the first machine for ruling paper. The same principles are still used in modern ruling machines. By replacing handwork with sound mechanical means for controlling both tool and work, this early Vermont machine builder cut the cost of this operation by 75%. This is another instance where the direct predecessors of Jones & Lamson performed an outstanding service to industry.



No. 7A Jones & Lamson Saddle Type Universal Turret Lathe with standard chucking equipment.

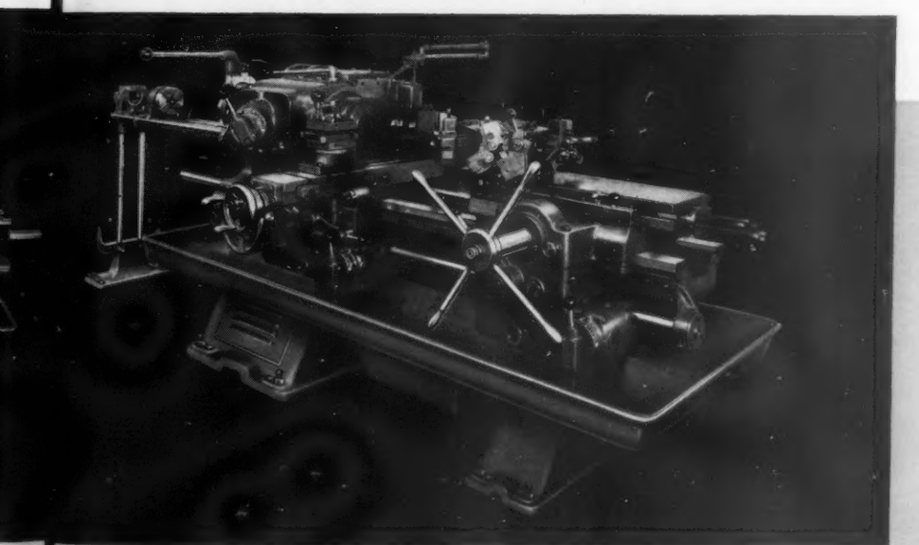
JONES & LAMSON

is still cutting costs for you!

Most of the machines built by Lemuel Hedge have long been obsolete. Obsolete also are the pioneer models of Vermont men who followed Hedge — men like Hubbard, Robbins, Lawrence, Howe and Hartness. Yet their original designs survive today, to cut costs for you, in modern Jones & Lamson Machine Tools — improved, advanced and speeded up through ceaseless development by present day Jones & Lamson engineers.

Because of these improvements, every modern Jones & Lamson machine embodies exceptional reserves of speed, rigidity and useful power. With these modern machines you can take *full* advantage of the hard alloy cutting tools now available *or in prospect*. With these machines you can meet the present demand for defense production and still be ready to compete successfully for postwar business.

To deal with today's emergency and protect your future profits, put your production problems up to Jones & Lamson engineers. Inquiries from large companies or small receive prompt attention here.

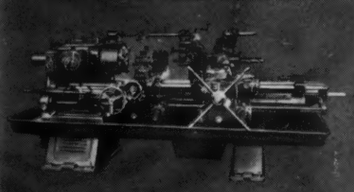


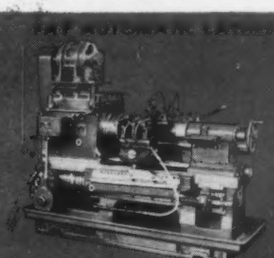
No. 3 Jones & Lamson Ram Type Universal Turret Lathe with standard bar equipment.

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers

MACHINE COMPANY

SPRINGFIELD, VERMONT, U. S. A.





PROFIT PRODUCING MACHINE TOOLS

OFFICE OF PRODUCTION MANAGEMENT

New Social Security building, Washington; Telephone Republic 7500

Director General
William S. Knudsen
Secretary
Herbert Emerich

Assoc. Dir. General
Sidney Hillman
General Counsel
John Lord O'Brien

Bureau of Clearance
Defense Industry Advisory Committees

S. J. Weinberg

Production Planning Board

R. E. Doherty, Chr.

Conservation and Substitution

Lessing Rosenwald

Bureau of Research and Statistics

Stacy May

Administrative Services

Roy Jackson

Materials Division

W. L. Batt, Director
C. E. Rhetts, Executive Asst.
A. I. Henderson, Deputy Dir. in charge Branches A-D.
Philip D. Reed, Deputy Dir. in charge Branches E-L.
C. K. Matthiessen Jr., Asst. Deputy Dir.
C. K. Leith, Technical Consultant
L. A. Morrisson, Canadian Relations
Edward Browning Jr. Liaison-Export control
Information: Russell Hogan

Branch A (Aluminum, Magnesium)
A. H. Bunker, Chief..... F. B. Cliffe, Asst. Chief

Branch B (Chemicals, Protective Coatings, Synthetic Rubber)
E. R. Weidlein, Chief ..G. M. Moffett, Asst. Chief
E. W. Reid, Asst. Chief

Branch C (Iron, Steel)
A. D. Whiteside, Chief ...S. E. Hackett, Asst. Chief
R. C. Allen, Asst. Chief

Branch D (Power, Gas, Water Supply, Public Sanitation)
J. A. Krug, Chief

Branch E (Cork, Asbestos)
F. W. Gardner, Chief

Branch F (Nickel, Monel, Nickel Alloys, other than Nickel Steel)
D. A. Uebelacker, Chief ...Lewis Jordan, Asst. Chief

Branch G (Tungsten, Molybdenum, Vanadium, Cobalt, Antimony, Beryllium and Ferroalloys of same)
H. K. Masters, Chief..... E. K. Jenckes, Asst.

Branch H (Copper, Brass and other Copper Alloys, Zinc, Cadmium)
J. A. Church, Chief..... G. C. Heikes, Asst.
Frank Ayer, Asst.

Branch I (Manganese, Chromium, Silicon, Zircon, Columbium, Tantalum, Titanium, Rutile, Spiegeleisen & Ferroalloys)

Branch J (Lead, Tin, Ilmenite pigment, Antifriction Bearing Metals, Solders)
Erwin Vogelsang, Chief ... S. K. Butterworth, Asst.

Branch K (Mica, Graphite, Gypsum, Magnesite, Cryolite, Fluorspar)
H. C. Sykes, Chief ..... H. F. Wierum, Asst.

Branch L (Miscellaneous minerals: Mercury, Industrial Diamonds, Quartz Crystals, Platinum group Metals, Radium, Uranium, Kyanite, Abrasives, Diamond Dies, Jewel Bearings)
R. J. Lund, Chief .....R. D. Parks, Asst.

Production Division

W. H. Harrison, Dir.

Information: Max Boyd

Shipbuilding
Adm. E. S. Land

Construction
W. H. Harrison

Tools & Equip.
Mason Britton

Aircraft
M. C. Meigs

Ordnance
E. F. Johnson

Purchases Division

Douglas C. MacKeachie, Dir.
Arthur Newhall, Deputy Dir.
Philip F. Maguire, Exec. Officer
Information: Bruce Catton

Food Supplies
Howard Cunningham

Health Supplies and Fire Equip.
W. Emmet Bittner

Textiles, Clothing, Equipage
R. R. Guthrie

Containers
Walter Shorter

Equipment & Supplies Procurement Advisory Branch
James MacPherson

Contract Clearance
Hiram S. Brown

Accounting & Distribution Advisory Branch
Eric Camman

Civilian Supply Division

Leon Henderson, Dir.
Jos. L. Weiner, Deputy Dir.
Dr. Reavis Cox, Supervisor, Industry Branches
Information: Leigh Plummer

Pulp & Paper
Norbert A. McKenna

Printing & Publishing
Norbert A. McKenna (acting chief)

Lumber & Building Mat.
John L. Haynes

Plumbing & Heating
John L. Haynes (acting chief)

Automotive Trans. and Farm Equipment
Andrew Stevenson (acting chief)

Electrical Products & Consumers Durable Goods
Jesse L. Maury

Industrial & Office Machinery
Nathan G. Burleigh

Rubber & Rubber Prod.
F. W. Gardner

State and Local Government Requirements
Maury Maverick

Priorities Division

Donald M. Nelson, Dir.

J. S. Knowlson, Deputy Dir.

Information: S. E. Fitzgerald

Contract Distribution Division

Floyd B. Odlum, Dir.

Information: Max Boyd

Labor Division

Sidney Hillman, Dir.
Isador Lubin, Dep. Dir.
Alex Taub, Consultant
Information: Herbert Harris

The Supply Priorities & Allocations Board was created Aug. 28, 1941 by President Roosevelt within the Office for Emergency Management to divide available materials, power and fuel and other commodities betweeen military, defense-aid and civilian needs. The board determines broad policies and regulations. The program is administered by OPM. SPAB members are Henry A. Wallace, chairman; Secretary of War Stimson; Secretary of the Navy Knox, Harry L. Hopkins; W. S. Knudsen; Sidney Hillman and Leon Henderson. Donald M. Nelson is executive director, although not a member; he presides in the chairman's absence. OPM re-assigned 28 industrial branches Sept. 10, 1941 among the Materials, Production, Purchases and Civilian Supply divisions in line with President Roosevelt's order August 28 placing the Civilian Supply Division of the former Office of Price Administration and Civilian Supply in OPM. No industrial branches are contemplated for the Priorities Division, the Labor Division or the recently created Contract Distribution Division which replaces the former Defense Contract Service. Office of Price Administration continues to function under Leon Henderson.

Trend Toward Allocation; "Priority Rules Must Be Scrupulously Obeyed"

■ ALLOCATION will be used more and more as the defense load steps up, OPM Priorities Director Donald M. Nelson announced last week. Priorities instruments now used will continue to be used as part of the system and all existing rules, orders and certificates must be scrupulously obeyed. Changes in the system will be worked out gradually.

Mr. Nelson's statement followed announcement of a national survey of priorities compliance. The statement, in part:

"From time to time we will make efforts to simplify the priorities system whenever necessary. We believe that, when scattered, individual problems become broad, general problems, they must be handled along broad, categorical lines. Our limited blanket ratings are examples of such broad treatment.

"But this does not mean that we expect, at any time, to make sudden, abrupt changes in the priorities system. The various instruments now used—the priority certificates, blanket and project ratings, allocation orders—will be continued. They have proven their usefulness. And any changes or additions to be made will be made gradually.

"One development which can be expected to work itself out over a period of months is an increased emphasis on direct allocation of materials. Since the start, the Priorities Division has allocated some materials—aluminum and nickel, for example—in which serious shortages exist.

"As these shortages increase, as the defense load steps up, allocation will have to be used more and more. We will have to know exactly what requirements are and where these requirements exist; we will have to know what the supply is; we will have to make decisions as to which among competing consumers for a scarce material will get it, which uses will be aided, which will be cut.

"When allocation is carried out fully,—typically by issuing instructions as to how much of what can be shipped to whom—this provides a clear-cut and exact way of dividing up any given scarce material. To the extent that allocation is used, it tends to diminish the need for use of preference rating certificates, especially among those primary consumers who are specifically selected to receive material.

"In making such allocations, of course, consideration is always given to the **end use** of the material desired by a particular consumer. Thus a company using aluminum for airplanes enjoys a better standing than one using aluminum for less essential purposes.

"When this field of operations has been fully explored, we can give more emphasis to two things: (1) allocation of raw materials into industrial channels; and (2) some method of classifying end uses of these materials in accordance with the interests of defense. Allocation on the one end, classification on the other—these are two basic aspects of any sound, simple priorities system. We are already doing both to some extent; we expect to do more along the same line. To the extent that this works out, we can expect to diminish the need for individual preference rating certificates, although neither the certificates nor any other part of the present system are likely to be given up altogether.

"To sum up:

"1. There will be **increased emphasis** on allocation of materials and classification of end uses.

"2. The priorities instruments used now **will continue to be used** as parts of the system.

"3. Changes made will be **worked out gradually**, over a period of time.

"4. All existing regulations and orders and certificates **must be scrupulously obeyed**, and violators will be held to account, punitive action being used if necessary.

"We recognize that the priorities system has caused some hardships. We will try, in anything we do, to avoid causing any hardships which can be avoided."

Two Magnesium Plants Authorized by DPC

WASHINGTON

■ Jesse Jones, federal loan administrator, announced last week that Defense Plant Corp., at the request of the War Department, had arranged for the construction and operation of two additional magnesium plants having a combined annual capacity of 60,000,000 pounds of metallic magnesium.

The Mathieson Alkali Works Inc., New York, will construct and operate one plant with an annual capacity of 36,000,000 pounds, costing approximately $16,000,000, at Lake Charles, La. The other plant will be built and operated by International Agricultural Corp. (Union Potash), New York, at Austin, Tex., with an annual capacity of 24,000,000 pounds, with chloride plant at Carlsbad N. Mex., having an overall cost of approximately $12,317,000.

Plants will be owned by Defense Plant Corp. and operated for its account. Aggregate of all plants contracted for by Defense Plant Corp. will be 298,000,000 pounds of metallic magnesium a year.

New Antiaircraft Gun Plant Started at Pontiac

PONTIAC, MICH.

■ Ground has been broken and foundation work started on a new defense plant at the Pontiac Motor Division here, made necessary by the tripling and again doubling of the original order for antidive bomber rapid-fire 20-millimeter Oerlikon guns from the Navy Department.

Pontiac's present Oerlikon gun plant has a total floor space of 345,000 square feet so that with the completion of the new plant in January more than 650,000 square feet of floor space will be devoted to the manufacture and assembly. This does not include other thousands of square feet of floor space in the plants of 41 subcontractors making parts for Pontiac.

Dimensions of the new building will be 480 x 640 feet. Construction will be a semiblackout type, quickly convertible into total blackout, of brick, steel and concrete with wood block flooring. The first floor manufacturing area will be divided into 40-foot square bays. Cafeteria and locker rooms accommodating 2500 at a time will be located in the basement.

Albert Kahn Associated Architects & Engineers Inc. is in charge of the job, while the structural steel work will be handled by the International Steel Corp., of Evansville, Ind. The 1600 tons of structurals already ordered will be delivered by Nov. 1, at which time the basement and flooring will be complete. Steel work will be up by Dec. 1, and the building finished ready for equipment between Jan. 1 and 15.

When the new plant is completed employment will be provided for approximately 5000, working in three shifts a day, six days a week.

Reo Truck Plant Rehabilitated To Build Aircraft Parts

LANSING, MICH.

Work of rehabilitating a second unit of the Reo Motor Car Co., the old truck plant on Mt. Hope avenue here, and of converting it into an aircraft parts plant soon will be started by Nash-Kelvinator Corp., which has been awarded a $15,150,000 contract by the Defense Plant Corp. of the RFC to rehabilitate the factory.

About 550,000 square feet of floor space is being put into shape to accommodate high-precision machinery for manufacture of essential parts of 18-cylinder, Pratt & Whitney motors. At peak, the plant will employ 4500.

Lincoln Renews Pledge Against Price Increases

■ Selling prices are now lower on products of Lincoln Electric Co., Cleveland, manufacturer of arc welding equipment, than they were two years ago, according to J. F. Lincoln, president.

Entitled, "We Renew Our Pledge", Lincoln's statement points out that the company's policy to maintain prices not only has been maintained since Oct. 2, 1939—when the pledge was first made—but it has actually reduced selling prices on arc welding machines and electrodes more than 6 per cent.

He gave as the reason "increased manufacturing efficiency resulting from the fine co-operative spirit and ability of employes."

CALL 'EM *RIGHT!*

If you find it difficult to describe a tap correctly, or if you are in any doubt about the exact meaning of certain terms, the definitions on this page may help you. Keep it for handy reference.

AXIS OF TAP: The longitudinal central line through the tap.

BODY: The threaded and fluted part of tap.

CHAMFER: The tapered outside diameter at the front end of the threaded section.

CUTTING FACE: The front part of the threaded section of the lands.

EXTERNAL (MALE) CENTER: Sometimes termed "male center." It is the cone shaped end of the tap. It is found only on small taps and is for manufacturing purposes. It is usually found only at the threaded end.

FLUTE: The groove providing for the cutting faces of the threads or teeth, for chip passage and for lubrication.

HEEL: The back part of the threaded section of the land.

HOOK: The curved undercut of the cutting face of the land.

INTERNAL (FEMALE) CENTER: Sometimes termed "female" center. It is the small drilled and countersunk hole at the ends of the tap, necessary for manufacturing purposes.

LAND: The threaded web between the flutes.

POINT DIAMETER: The outside diameter at the front end of the chamfered portion.

RADIAL: The straight cutting face of a land which, if continued, would pass through the center of the tap.

RAKE: The angle of the cutting face of the land in relation to a straight line from the point of the cutting face to the axis.

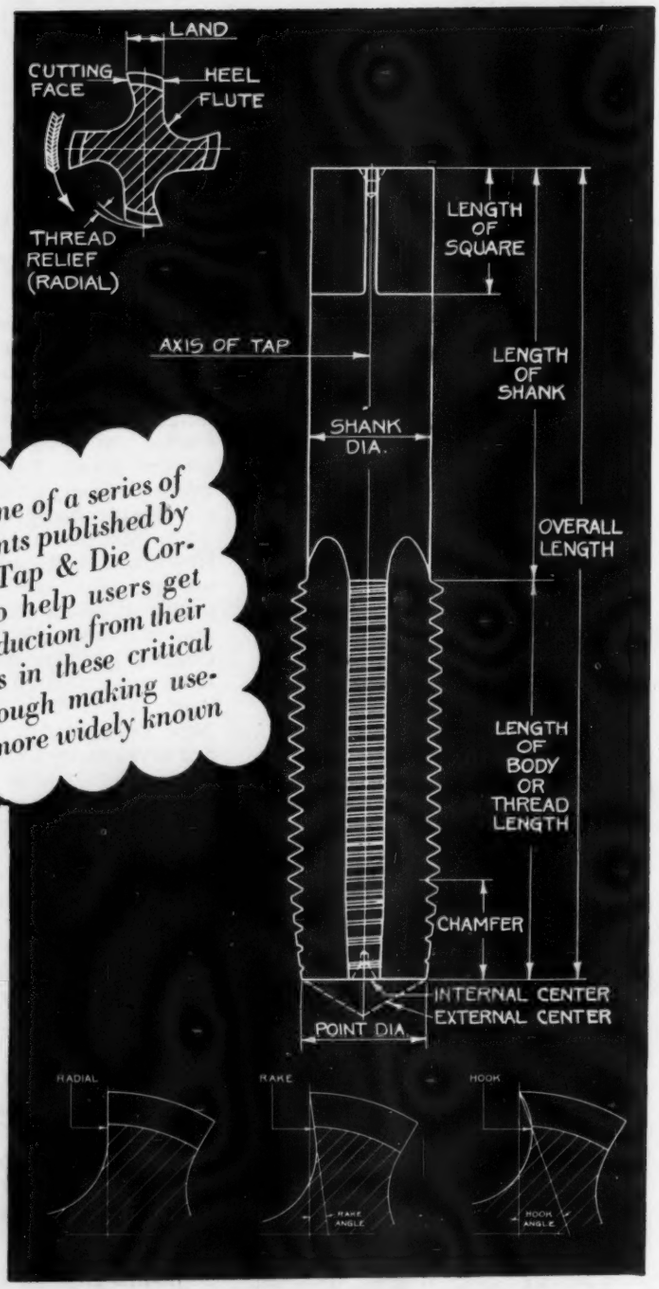
SHANK: The part behind threaded and fluted section of tap.

SQUARE: The squared end of the tap shank.

THREAD: The cutting tooth of the tap which produces the thread.

THREAD RELIEF (RADIAL): A clearance providing a gradual decline in the major, pitch and minor diameters of the lands, back of the cutting face. This style of relief is applied only to certain sizes and types of taps.

This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known



GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

GREENFIELD TAP AND DIE CORPORATION
Greenfield, Massachusetts
Detroit Plant: 2102 West Fort St.
Warehouses in New York, Chicago and Los Angeles
In Canada:
Greenfield Tap and Die Corp. of Canada Ltd., Galt, Ont.

Mirrors of *MOTORDOM*

Epidemic of wildcat strikes indicative of labor's resistance to layoffs resulting from production curtailment. Union officials agree to disciplinary measures . . . Watch progress of "dealer pricing" policy inaugurated by Chrysler . . . Cadillac, Mercury, Dodge Truck supply details of new lines . . . Briggs to make aircraft gun turrets

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ LABOR'S first answer to layoffs occasioned by curtailment of car production came last week and, as expected, was the pernicious "wildcat" strike. A handful of men here and there, refusing to work because of some dissatisfaction, soon throws carefully integrated production out of gear, and in the space of a few hours entire plants must be closed. Such interruptions are in defiance of union contracts and even union officials appear powerless to combat them.

One of the sorest spots for trouble of this type has been the Mack avenue plant of Briggs Mfg. Co., body manufacturer, supplying principally Plymouth, where in the past two months there have been 15 of these strikes which have meant loss of better than 160,000 man-hours of production. On top of these have been innumerable slowdowns which have caused plant officials nearly to despair of maintaining any sort of smooth production.

Object To Transfer

Coming to a head last week, the strike interruptions caused closing of the plant and dismissal of 3500 employes, and the subsequent closing of the Plymouth assembly plant with 8000 workmen. The difficulty at Briggs grew out of the attempted transfer of four men from a body panel line to a frame department. Slowing of production by virtue of government restrictions necessitated transfer of the men, which was done in accordance with seniority provisions and after consultation with union officials. However, men in the frame department refused to work with the four new men on the grounds it would mean dismissal of four regular employes in the department.

Then, to make matters worse, the men in the body panel department chimed in with threats of refusal to work if the four new men were not accepted on the frame line. After two days of strikes, union officials, recognizing their responsibility in living up to contract provisions, agreed to the management's dismissal of ringleaders of the strike. But this move did not appear likely to get at the root of the trouble.

Basically the matter devolves upon failure of automobile workmen to understand that the industrial section of the country is engaged in a major war effort which necessarily must result in unemployment in consumer goods industries. True, all they would have to do is to read the newspapers to realize this, but apparently there is no such general realization. The unAmerican act of a few men walking out on their jobs because some of their pals have to be laid off as a result of lack of work essentially is just as traitorous to national welfare and defense as sabotage or strikes in defense plants.

In a lengthy statement analyzing current labor problems, the Briggs management concludes by stating "it will be impossible to run the Mack avenue plant at all unless labor conditions there are cleaned up."

Over at the huge Dodge main plant Tuesday more labor trouble flared when 300 men walked out of the paint department and resulted in clogging production to the point where 10,000 had to be sent home. The strikers claimed some of their number were "becoming ill" because of poor ventilation of spray booths—a strange complaint in view of recent fairly complete modernization of Dodge painting facilities. An industrial hygiene expert from a local hospital was called in to investigate and reported no serious need for ventilation equipment, but that a few extra fans would do no harm. The company replied that such fans had been ordered but were being held up because of "low priority."

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Chrysler Dealers Plan To Set Own Retail Prices

Novel price policy inaugurated by Chrysler Corp. for 1942 models is being studied with interest by automotive observers. Instead of advertising "delivered" prices for all sections of the country, Chrysler is setting only wholesale prices to dealers and allowing retail outlets to set their own prices to buyers. Thus the prices on any of the Chrysler Corp. line—Plymouth, Dodge, DeSoto and Chrysler—are likely to be different with every dealer.

Such a policy relieves the manufacturer of any necessity to police its dealers on price and also avoids, at least for the present, any responsibility to government price control authorities for the retail prices of cars. Chrysler, it will be remembered, was the subject of considerable castigation by Price Administrator Henderson last spring when increases on 1941 models were put into effect.

With dealers setting their own prices, it would appear likely the old practice of shopping around and baiting dealer against dealer to get the best price will be revived; and furthermore all obstacles to the much-stigmatized "packing" of prices by dealers are removed.

As a matter of fact, the net amount of money received for all new cars is controlled by the whims of dealers, in view of the wide disparity in trade-in allowances on used cars. So even if retail prices on new cars are set rigidly, the buyer can get the benefit of a "lower" price by persuading a dealer to up his bid on an old car. In the long run, there is little choice for the buyer with an old

car to trade whether the new car price is frozen by the manufacturer or is determined by the dealer.

Clean Lines in Cadillac

Cadillac observes its fortieth anniversary year with six series of 1942 models featuring added width and lower overall height. Fenders have been lengthened and extend deep into doors. The effect is created by attachment of so-called fender caps to the doors, which carry the line of the front fender across the door.

Added assembly effort of attaching these caps was minimized by building a "hump" into the conveyor line at the point of installation so that operators can stand erect as they install the caps. This type of detachable cap permits easy repairs of dented or damaged sections.

Hood louvers and cowl ventilator have been removed from the Cadillac lines, marking complete elimination of cowl panels from all General Motors lines. New ventilation systems have been adopted, with intakes placed behind radiator grilles. Engine of 150-horsepower and V-8 type is continued without change in Cadillac. Gas tanks are heavier, rear spring pads are of new design and shock absorber valving has been improved. Exterior appearance of the new model is exceptionally "clean" with elimination of moldings and hood louvers. Sole decorative effect on the side is a heavy horizontal section of bright metal set low across both fenders.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,058
Feb.	317,520	422,225	509,326
March	389,499	440,232	533,849
April	354,266	452,433	489,854
May	313,248	412,492	545,355
June	324,253	362,566	546,278
July	218,600	246,171	*468,895
Aug.	103,343	89,866	164,792
8 mos.	2,377,691	2,875,477	3,782,440
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

*Revised.

Estimated by Ward's Reports

Week ended:	1941	1940†
Sept. 6	32,940	39,665
Sept. 13	53,165	66,615
Sept. 20	60,560	78,820
Sept. 27	78,535	95,990
Oct. 4	76,820	105,153

†Comparable week

Mercury Lower and Wider

Increased performance with higher power-weight ratio, greater riding comfort and road stability, less overall height, improved brakes and an optional fluid-automatic drive are features of the Mercury for 1942. Increased horsepower is obtained by improved engine exhaust system and combustion chamber design. In the latter slots are milled between cylinder bores and valve ports, thus increasing the area through which the mixture can enter and the exploded gases can leave the cylinders. Valves have been changed to high-chromium alloy steel, with inserts under both intake and exhaust valves of 15 per cent chrome-molybdenum steel.

Wheels are smaller (5.00 x 15), chassis springs are longer, front engine mount is of a new cradle type, eliminating radius rods formerly used. Front and rear treads are 1¾ and 1¼ inches wider, respectively. Pedal pressure on brakes has been reduced about 15 per cent, and 60 per cent of braking effectiveness is directed to front wheels. Six body types are offered. The optional drive mechanism for Mercury is the same as that described in this department last week for Lincoln.

112 Types of Dodge Trucks

Dodge has announced new truck models for 1942, the complete line now including 112 standard chassis and body types on 18 different wheel bases, ranging in capacities from ½-ton pickup to heavy-duty gasoline and diesel-powered units. Higher horsepower, improved air cleaners and fuel filters, stronger clutch housings and heavier frames are features.

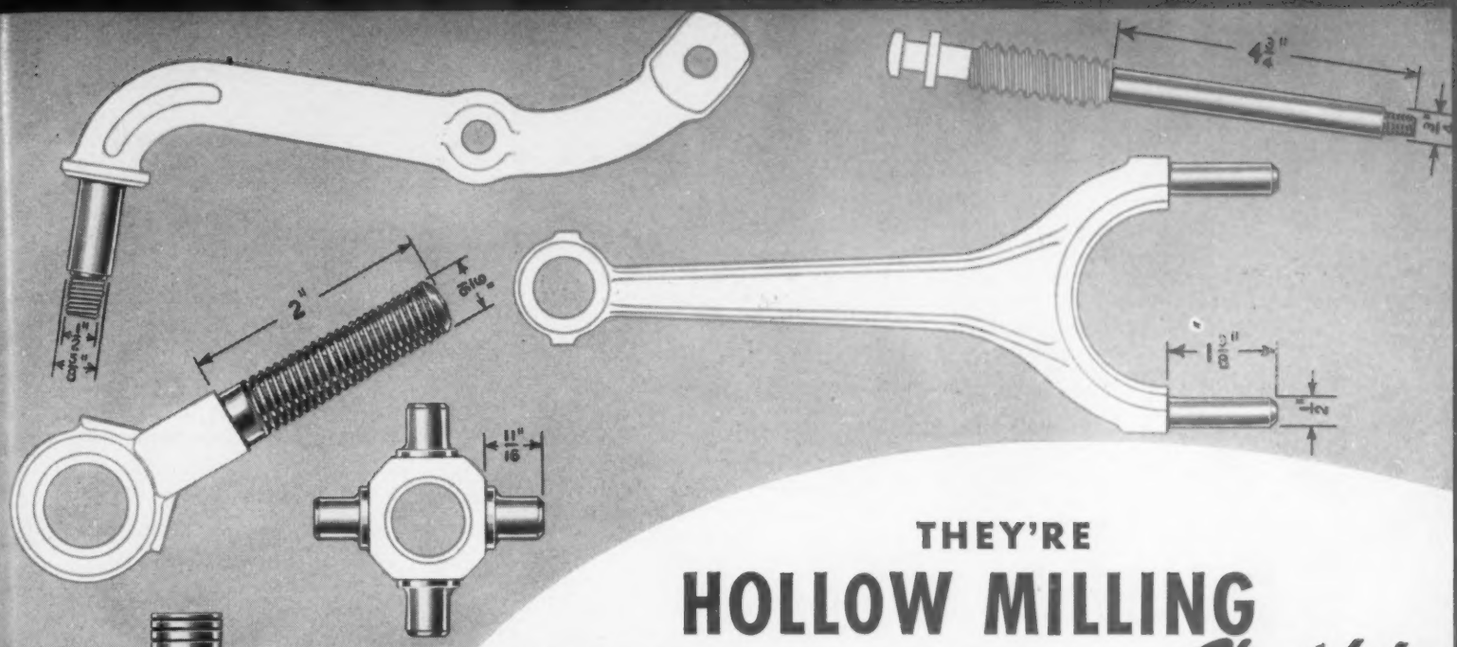
Hudson has developed an improved type of embossed and illuminated leather trim for car interiors, said to be a modern version of the ancient art of hand-tooling and illuminating leather. A polychromatic effect is obtained by what is termed the Burkhardt process in which pyroxylin polychrome enamel is sprayed through stencils onto the embossed leather, the latter being done with special dies.

Look for Additional Phase Of Ford Defense Work

On the defense front, activity around Detroit becomes furiouser and furiouser. Tooling for the automotive bomber program is proceeding rapidly and numerous automotive die shops are crammed with

(*Please turn to Page* 116)

■ **Placing the assembly line on stilts at the point where these fender caps are attached permits Cadillac workmen to stand erect while installing the cap on the door panel**



THEY'RE

HOLLOW MILLING

THESE "PRODUCTION-LINE JOBS" THE *Short Way*

Makers of these and hundreds of other hollow milled parts have switched from single point tools to Namco Hollow Milling Multiple Cutter Heads because—

4 chips at each pass give them 300% gain in cutting time alone.

On jobs having more than one diameter, shoulders and radii, they eliminate fussing with separate single point adjustments, for one simple adjustment in a Namco head brings all the cutters into final position.

With duplicate sets of cutters reground and checked in the tool room, ready—there is no fussing with individual tools, no scrap loss in getting started—production is practically continuous.

You can hollow mill or cut threads with the same Namco head simply by changing cutters and blocks—"Double Duty" tools.

Ask us to show you how the SHORT WAY will save time and cost on your hollow milling jobs.

NATIONAL ACME

170 EAST 131ST STREET • CLEVELAND, O.

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

Activities of Steel Users, Makers

■ DETROIT Ball Bearing Co., Detroit, is erecting a building for its Grand Rapids, Mich., branch. Earlier this year arrangements were made to establish a branch at Saginaw, Mich., to expedite deliveries to defense industries in that area.

♦

Completion of a plant expansion program was reported last week by Lothair Teetor, president and general manager, Perfect Circle Co., Hagerstown, Ind. Both the Hagerstown plant and the New Castle, Ind., foundry have been enlarged and modernized. Sales in the first eight months this year are at a new high.

♦

Wheelco Instruments Co., Chicago, is now located in the Wheelco building, Harrison and Peoria streets, having completed its third major expansion.

♦

Sheldon Machine Co. Inc. has moved into its modern new monitor-type daylight plant at 4240-58 Knox avenue, Chicago. Lathe production, it is reported, will be tripled.

♦

Plomb Tool Co., Los Angeles, has leased a large building adjacent to its main office and factory to ease crowded conditions in its stockroom and to house the contract shipping department.

♦

Modern Motor Drives Inc., Elkhart, Ind., now manufactures the line of motor drives formerly fabricated by Quality Hardware & Machine Corp., Chicago.

♦

Chase Drier & Chemical Co. has removed its offices to 4150 East Fifty-sixth street, Cleveland. Former location was 3505 Smallman street, Pittsburgh.

♦

H. T. Canfield Engineering Associates has been established at 61 Broadway, New York. The new organization will give particular attention to problems involved in the integration of utility systems and changes of ownership. Services rendered include economic and business reports, valuations, cost analyses, depreciation and rate studies and regulatory matters and proceedings.

♦

Carlton Machine Tool Co., Cincinnati, has purchased a factory building formerly occupied by the Rahn-Larmon Co. at 2941 Spring Grove avenue.

♦

Lindberg Engineering Co., manufacturer of heat treating equipment, was host to its suppliers, Saturday afternoon, Sept. 20, at an open house party in its new plant and offices at 2450 West Hubbard street, Chicago. About 500 attended. Families and friends to the number of 1000 were guests of the company, Sunday, Sept. 21. Customers attended a third party, Saturday, Sept. 27.

♦

Harris Calorific Co., Cleveland, manufacturer of gas welding and cutting apparatus, has established a factory branch at 619 West Washington boulevard, Chicago. H. D. North Jr., for the past three years factory manager in Cleveland, is manager of the new office.

MEETINGS

Steel Fabricators To Discuss Defense Problems

■ PROBLEMS growing out of the national emergency are scheduled for discussion at the nineteenth annual convention of the American Institute of Steel Construction, Oct. 14-17, Greenbrier hotel, White Sulphur Springs, W. Va. E. P. Palmer, of Senior & Palmer, New York, will speak on "Defense Construction"; Col. G. F. Jenks on "The Application of Welding in the Construction of Ordnance Material"; S. T. Henry, assistant to president, McGraw-Hill Co., New York, on "Post War Construction"; and G. Douglas, secretary, committee on taxation of National Association of Manufacturers, on "New Taxes." A motion picture showing construction of new Rainbow bridge, Niagara Falls, N. Y., will be exhibited and work explained by J. Jones, chief engineer, fabricated steel construction, Bethlehem Steel Co., Bethlehem, Pa. Sessions will be devoted to a priority clinic.

Convention Calendar

Oct. 6-10—National Safety Council. Thirtieth annual meeting at Hotel Stevens, Chicago. W. H. Cameron, 20 North Wacker Drive, Chicago, is managing director.

Oct. 8-10—Porcelain Enamel Institute Inc. Sixth annual forum at Ohio State University, Columbus, O. C. S. Pearce, 612 North Michigan avenue, Chicago, is managing director.

Oct. 12-15—American Society of Mechanical Engineers. Fall meeting, Brown hotel, Louisville, Ky. C. E. Davies, 29 West Thirty-ninth street, New York, is secretary.

Oct. 14-17—American Institute of Steel Construction Inc. Annual convention at White Sulphur Springs, W. Va. V. Gilmore Iden, 101 Park Place, New York, is secretary.

Oct. 16-18—American Society of Tool Engineers. Semiannual meeting, Toronto, Canada. Ford R. Lamb, Room 428, Boulevard Temple building, 2567 West Grand boulevard, Detroit, is executive secretary.

Oct. 19-24—American Welding Society. Annual meeting at Bellevue-Stratford hotel, Philadelphia. M. M. Kelly, 33 West Thirty-ninth street, New York, is secretary.

Oct. 20-22—American Gas Association. Annual meeting at Auditorium, Atlantic City, N. J. K. R. Boyes, 420 Lexington avenue, New York, is secretary.

Oct. 20-24—Wire Association. Annual meeting at Philadelphian hotel, Philadelphia. R. E. Brown, Stamford Trust building, Stamford, Conn., is executive secretary.

Wisconsin Tags Designed for Two Years' Service

■ **Wisconsin state officials are displaying a new sample auto license plate for 1942, designed with rounded corners. Motorists buying 1943 licenses will retain their old plates, receive metal tags bearing the number "43" to be attached where the strip marked "40" is bolted to plate above. Plastics and other materials have been suggested for plates "to conserve steel", but the strength and long-life quality of steel have led to proposals in several states to use the plates more than one year. NEA photo**

Industrial Research Activities To Be Maintained or Accelerated in 1942

■ BEARING of economic, political and social trends on industrial research policies was the keynote of Industrial Research Institute's fall meeting in Detroit, Sept. 26-27. More than 50 executives and research directors attended and participated in discussions of research management problems. Chrysler Corp. and Ford Motor Co. were hosts on tours through their respective research laboratories and the Chrysler tank arsenal.

The institute, an affiliate of the National Research Council, was organized several years ago to promote better management in industrial research organizations. Membership is composed of companies maintaining research laboratories.

"Current economic conditions, as well as long-term trends, are giving powerful stimulus to industrial research," Maurice Holland, director, division of engineering and industrial research, National Research Council, told delegates.

An impromptu poll of the group, which is a representative cross section of the 2300 industrial research laboratories of the country, disclosed that all plan either to maintain the present rate of their research activities in 1942 or to increase it. The problems of obtaining materials with which to carry on research today, and of ways and means of setting up reserves to insure research during the lean years that may follow the defense period, were discussed.

Asks More Co-operation

Prof. A. H. White, head, department of chemistry, University of Michigan, Ann Arbor, Mich., and president, Society for the Promotion of Engineering Education, addressed a dinner meeting on the possibilities for more effective co-operation between universities and industry in the education, selection and training of college men for research employment in industry.

He advocated increased industrial support for graduate fellowships in universities, summer employment of undergraduates in industrial research laboratories, and also the co-operative plan of education in industrial centers; and urged that industry send more of its promising young research men back to universities for advanced training.

A. G. Ashcroft, product engineer, Alexander Smith & Sons Carpet Co., Yonkers, N. Y., and chairman of the institute's committee on education, outlined a program of action that might lead to closer co-operation between universities and the institute. This would include an attempt to formulate specifications for the academic training of research men, to suggest improvements in present methods of selecting college men for research employment in industry, and to report on possibilities of co-operative training as a means of recruiting personnel.

Professor White offered the co-operation of his society in this program.

F. W. Blair, chemical director, Procter & Gamble Co., Ivorydale, O., was elected chairman of the institute to succeed L. W. Wallace, vice president, Trundle Engineering Co., Cleveland, consulting management firm, and until recently director of engineering and research, Crane Co., Chicago. H. S. Benson, research division, United Shoe Machinery Corp., Beverly, Mass., was elected vice chairman. Philip W. Pillsbury, president, Pillsbury Flour Mills Co., Minneapolis, was named a new member of the executive committee.

Continuing as members of the executive committee are: H. Earl Hoover, vice president, The Hoover Co., Chicago; Mr. Hainsworth; Caryl P. Haskins, president, Haskins Laboratories, New York; Maurice Holland, director, division of engineering and industrial research, National Research Council, New York; and R. C. Newton, chief chemist, Swift & Co., Chicago. C. G. Worthington, 8 South Michigan avenue, Chicago, is secretary.

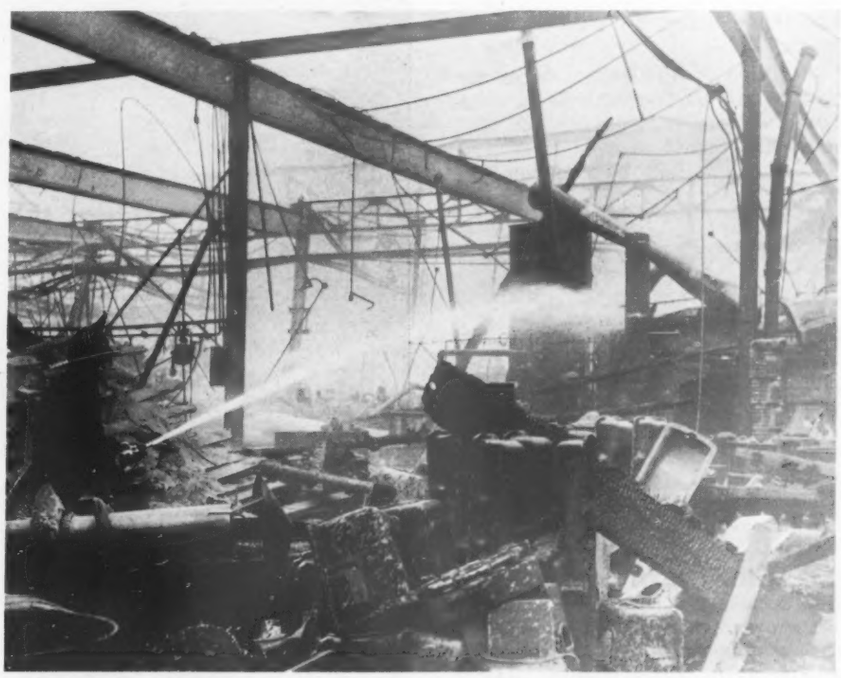
Industry Spending $117,490,000 For Research During 1941

Manufacturing industry in America is spending $117,490,000 for research this year, according to a National Association of Manufacturers survey, conducted by Dr. Karl T. Compton, president, Massachusetts Institute of Technology. Average 1941 outlay by companies engaged in industrial research will exceed $116,000 per company.

Forty-nine per cent of the companies questioned stated their 1941 budget is greater than last year; 43 per cent reported no change; only 8 per cent are spending less.

Last year's research expenditures by selected industries: Iron and steel, $8,024,000; nonferrous metals, $2,963,000; machinery, excluding transportation, $45,474,000; transportation equipment, $10,259,000.

Fire Destroys Defense Plant



■ **Tangled wreckage was all that remained after a $2,250,000 fire destroyed the National Bronze & Aluminum Foundry Co. in Cleveland last week. The company, one of the larger aluminum foundries, was engaged 70 per cent in defense work and supplied castings for aircraft engines, plane fuselages, diesel engines, gun turrets and antiaircraft searchlights. Federal Bureau of Investigation is investigating, although Cleveland fire officials believe it was caused by spontaneous combustion in a storage room stacked with oil-soaked bags of aluminum scrap**

Taxes To Take 57 Cents Of Gross Income Dollar

■ With dollar volume of contracts 52 per cent greater than in 1940, there now is "greater honor in fulfillment than in acquirement of orders," says Robert E. Baker, secretary, Arthur G. McKee & Co., Cleveland, in a letter to stockholders.

"Volume of new inquiries for plant construction continues to be larger, but we note that closing of the contract is being delayed in some cases. Such delays are probably due to necessity of making arrangements for government participation, or to bring the projects into conformity with defense requirements.

"The major portion of contracts taken during 1941 has been in connection with iron and steel plant construction. Oil refinery construction in the United States has been at a minimum during the present year and impossibility of refinery construction in most foreign fields has greatly reduced that branch of our business. When the present war ends we anticipate resumption, probably on a large scale, of oil refinery construction."

The letter points out that although the nature of the company's work—the maintenance and expansion of facilities for production of iron and steel—would seem to justify making needed materials and equipment readily available, considerable difficulty and delay has been experienced. Obtaining skilled and common labor is less difficult than materials.

Although profits before taxes are expected to be the highest in company's history it is anticipated that at least 57 cents of every dollar of gross income will be required for taxes.

Sheffield Corp. Awards Scholarships to Employes

■ Two five-year scholarships to the Department of Mechanical Engineering, College of Engineering and Commerce, University of Cincinnati, have been awarded by the Sheffield Corp., Dayton, O., to two of its younger employes, Howard Gebhart and Carl L. Hoffmeyer.

The awards, known as the Elizabeth L. and O. M. Poock scholarships and valued at $2000 each, were won in a series of competitive examinations open to Sheffield employes. Three runners up in the competition, James R. Shaffer, James Shaeffer and Edward Salmon, were given one year scholarships at the University of Dayton.

Sheffield Corp., industrial gage manufacturer, has been conducting a defense training program since the beginning of the national emergency. For some time Sheffield has employed a number of University of Cincinnati co-operative students during their industrial plant field work.

Elizabeth L. and O. M. Poock are the parents of Louis Poock, president of Sheffield.

Navy "E" Flag Flies Over Consolidated Tool Plant

ROCHESTER, N. Y.

■ Recognition for an outstanding accomplishment in production of machine tool equipment for the United States Navy has been accorded Consolidated Machine Tool Corp. This is represented by the Navy "E" pennant and the Navy's Bureau of Ordnance flag. Presentation was made before nearly 3000 in Auditorium theater here, on the evening of Sept. 25, the ceremonies including a musical program, addresses by high ranking naval officers, and representatives of the city government and industry, and a flag-raising in the theater.

In his presentation speech, Rear Admiral W. T. Cluverius, United States Navy (Retired) said: "After inspecting your plant, I truthfully can say that nowhere have I seen a more splendid Navy machine shop. There are evident therein the finest examples of quiet efficiency, permeated by loyalty, that I ever have seen. You are doing a grand job for defense!"

Arthur H. Ingle, president of the company, accepted the flags in behalf of his organization, while veteran employes Edward Sayers, Charles J. Knapp and Oscar Anderson accepted the Navy "E" lapel buttons in behalf of the entire company personnel. Addressing the personnel, Mr. Ingle said: "This award has been made possible by the loyalty and co-operation of each and every worker. The company is very proud of your accomplishment and you are justified in being equally proud of the exceptional honor which has come to you and which gives you the right to wear the Navy 'E.'

"We must not forget, however, that our work is not yet finished. . . . We must not let down."

Steel Works, Employes Awarded Navy "E" Insignia

BURNHAM, PA.

■ The Navy "E" pennant, denoting excellence and efficiency, and formerly an honor bestowed exclusively upon naval personnel, was awarded with the Bureau of Ordnance flag to the Standard Steel Works Division of Baldwin Locomotive Works, "For outstanding production of Navy ordnance."

Three thousand employes, officials and their families listened to Rear Admiral George T. Pettengill, commandant of the Navy Yard and superintendent of the Naval Gun Factory, Washington, as he presented the coveted award to Charles E. Brinley, president of Baldwin Locomotive Works, who accepted the honor in behalf of employes.

Each employe of Standard also was awarded a lapel button bearing the Navy "E" insignia. The two employes selected to receive the first of the buttons were John McCurry Sr., and Bernard T. Shields, each employed at Standard Steel more than 54 years. Left to right in photo, Brinley, Pettengill, Shields and McCurry.

War Department Placed $96,536,258 National Defense Contracts in Week

■ CONTRACTS for defense supplies reported last week by the War Department totaled $96,536,258. Ordnance Department awards were again most numerous, and many individual contracts were small.

Three aircraft builders were awarded small contracts for airplanes being tested by the Army as liaison ships with ground units. Craft are small high wing monoplanes, powered by a single 4-cylinder motor of low horsepower. Aeronca Aircraft Corp., Middletown, O., received an award for $11,329; Taylorcraft Aviation Corp., Alliance, O., $13,384; and Piper Aircraft Corp., Lockhaven, Pa., $12,492. Other contracts included:

Ordnance Department Awards

Accurate Tool Co., Newark, N. J., punches, firing pins, and anvils, $23,670.

Acme Electric Heating Co., Boston, blocks, $1768.80.

Acme Industrial Co., Chicago, gages, $19,372.30.

Adirondack Foundries & Steel Inc., Watervliet, N. Y., castings, $6494.91.

Allegheny Ludlum Steel Corp., Brackenridge, Pa., gages, steel, $30,371.25.

Allis-Chalmers Mfg. Co., Milwaukee, parts for tanks, $2002.60.

American Brass Co., Waterbury, Conn., phosphorus bronze bars, $5544.

American Car & Foundry Co., New York, parts for generator brackets, fuel tank car covers, $10,830.08.

American Locomotive Co., New York, turrets, $6082.

American Tool Works Co., Cincinnati, lathes, $68,418.70.

American Twist Drill Co., Detroit, cutting tools, $5160.26.

Armco Railroad Sales Co., Middletown, O., steel, $7538.23.

Armstrong Cork Co., Lancaster, Pa., shells, $3,062,000.

Arrow Tool & Reamer Co., Detroit, cutters, $6048.

Associated Spring Corp., Wallace Barnes Co. Division, Bristol, Conn., operating rod springs, $60,000.

Atlas Drop Forge Co., Lansing, Mich., forgings, $4040.30.

Atlas Press Co., Kalamazoo, Mich., drilling machines, lathes and drill presses, $15,069.10.

Babcock & Wilcox Tube Co., Beaver Falls, Pa., seamless steel tubing, $1729.43.

Barnes Drill Co., Rockford, Ill., honing machines, $23,670.

Bay State Tool & Machine Co., Springfield, Mass., test assembly actions, $10,650.

Bearing Co. of America, Lancaster, Pa., ball bearings, $9720.

Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J., generator filters and parts for tanks, $9756.30.

Bethlehem Steel Co., Bethlehem, Pa., breech rings, joists, $223,568.

B. G. Corp., New York, spark plug cores, $3425.

Black & Decker Mfg. Co., Towson, Md., drilling and sawing machines, $8431.20.

Bliss & Laughlin Inc., Harvey, Ill., steel, $12,480.53.

Bradford Machine Tool Co., Cincinnati, lathes, $12,654.

Breeze Corps. Inc., Newark, N. J., parts for tanks, housing assemblies, $480,705.

Bridgeport Thermostat Co. Inc., Bridgeport, Conn., barrel reflectors, $15,309.55.

Broderick Co., Muncie, Ind., shells, $1,690,000.

Budd Wheel Co., Detroit, assemblies, $3095.60.

Carboloy Co. Inc., Detroit, tools, $12,912.50.

Carpenter & Paterson, Medford, Mass., bronze castings, $2948.65.

Century Electric Co., St. Louis, motors for turret lathes, $32,736.22.

Champion Foundry & Machine Co., Chicago, blowers, $3910.

City Engineering Co., Dayton, O., gages, $1436.50.

Cleveland Cutter & Reamer Co., Cleveland, parts for cartridge cases, $2490.30.

Cleveland Twist Drill Co., Cleveland, drills and reamers, cutting tools, $13,173.

Colonial Broach Co., Detroit, broaching machines, $6387.50.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., breech glands, $2778.75.

Continental Machines Inc., Minneapolis, contour machines, $28,900.

Continental Motors Corp., Muskegon, Mich., flywheel assemblies, studs, and parts for Continental engines, $293,798.

Cowles, C., & Co., New Haven, Conn., oilers, $3915.

Crane Co., Chicago, pipe, $1502.60.

Crucible Steel Co. of America, New York, steel, $17,739.30.

De Sanno, A. P., & Son Inc., Phoenixville, Pa., wheels, $1201.39.

Detroit Seamless Steel Tubes Co., Dearborn, Mich., steel tubing, $7677.28.

Dole Valve Co., Chicago, primer pumps, $2550.

Dreis & Krump Mfg. Co., Chicago, presses, $1393.

Drive-All Mfg. Co., Detroit, motorizing units, $16,420.

Duplex Mfg. Corp., Sherman, N. Y., steel chests, $5103.

Dutton-Lainson Co., Hastings, Nebr., oil guns, $7733.76.

Eastman Kodak Co., Rochester, N. Y., polishing machines, $5000.

Edwards Mfg. Co., Cincinnati, steel boxes, $254,160.

Efficient Tool & Die Co., Cleveland, fixtures and drills, $1340.

Ellis, R. E., Engineering Co., Chicago, cutters, $1152.90.

Emerman, Louis E., & Co., Chicago, horizontal boring mills, $12,975.

Empire Finished Steel Corp., Newark, N. J., steel bar, $7456.37.

Engineering Products Co., Providence, R. I., fixtures, $1080.

Epstein, M. K., Co., Springfield, Mass., alloy pots, $2440.

Ex-Cell-O Corp., Detroit, boring machines, tools, $21,135.25.

Federal Laboratories Inc., Pittsburgh, cartridges, $62,000.

Finkl, A., & Sons Co., Chicago, forgings, $1405.05.

Firth-Sterling Steel Co., Philadelphia, tools and dies, $10,114.65.

General Electric X-Ray Corp., Newark, N. J., industrial X-ray cassette and unit, $3912.

General Engineering & Mfg. Co., St. Louis, shaper machines, $6536.70.

General Machinery Corp., Niles Tool Works Division, Hamilton, O., electrical equipment, and lathes, $156,336.57.

Gisholt Machine Co., Madison, Wis., lathes, $32,368.

Goddard & Goddard Co. Inc., Detroit, cutters, $1519.56.

Greenfield Tap & Die Corp., Greenfield, Mass., gages, $19,327.20.

Guiberson Diesel Engine Co., Chicago, parts for engines, $42,789.

Hadley Special Tool Co. Inc., Boston, tools, $5054.40.

Hartford Electric Steel Co., Roxbury, Mass., castings, $9157.50.

Hebar, W. F., & Co., Chicago, gasoline operated crane, $4145.

Heinrich, Carl, Boston, transits for optical work, $1568.

Hemp & Co. Inc., Macomb, Ill., fin assemblies, $4120.

Hesse Machine & Mfg. Co. Inc., Boston, gages, $17,095.

Hill-Clarke Machinery Co., Chicago, planers, $27,400.

Hind Steel Co. Inc., Union, N. J., steel, $8092.64.

Illinois Tool Works, Chicago, cutters, $1860.

Imperial Brass Mfg. Co., Chicago, gasoline strainers, $1600.

Jessop Steel Co., Washington, Pa., steel, $11,012.06.

Johnson Claflin Corp., Marlboro, Mass., gages, $4504.50.

Kaufman, L. J., Mfg. Co., Manitowoc, Wis., tapping machine and drilling machine, $1596.50.

Kent Aircraft & Machine Tool Co., Camden, N. J., gages, $17,869.50.

Kohler Co., Kohler, Wis., shells, $1,750,000.

Lamson Corp., Syracuse, N. Y., parts for machine gun mounts, $2420.70.

Landis Tool Co., Waynesboro, Pa., grinding machines, $34,149.

Leeds & Northrup Co., Philadelphia, instrumentation and rayotube equipment, $2949.38.

Lewis-Shepard Sales Corp., Watertown, Mass., trucks and dollies, $1589.26.

Link Belt Co., Indianapolis, iron castings, $2998.80.

Lite Mfg. Co., New York, spare barrel covers, $32,328.

Lobdell Car Wheel Co., Wilmington, Del., airhammers, $12,750.

Magnaflux Corp., Chicago, magnaflux generators, $1040.

Manning, Maxwell & Moore Inc., Bridgeport, Conn., assembled testers, pressure gage, $1440.

Maremont Automotive Products Inc., Chicago, mufflers, $13,059.20.

May Co., Moline, Ill., wall radiators, and pipe, $9438.33.

McKinney Mfg. Co., New York, hinges, hasps and swivel assemblies, $56,030.80.

Mesta Machine Co., Pittsburgh, forgings, $199,525.

Michigan Tool Co., Detroit, lathes, $137,308.

Midvale Co., Nicetown, Philadelphia, suspension rod, steel forgings, $23,023.33.

Midwest Tool & Mfg. Co., Detroit, drills and reamers, $3074.40.

Modern Collet & Machine Co., Ecorse, Mich., collets, $1080.

Modern Machine Corp., Brooklyn, N. Y., gages, $1605.

Mohawk Machine & Tool Co., New York, gages, $3272.

Moline Furniture Works, Moline, Ill., chests, $1576.80.

Monarch Machine Tool Co., Sidney, O., lathes, $14,391.54.

Morse Tool Co. Inc., Detroit, cutters, reamers, turning tools, other equipment, $423,164.15.

Motch & Merryweather Machinery Co., Cleveland, sawing machines, $6182.

Mt. Vernon Die Casting Corp., Mt. Vernon, N. Y., booster cups, $38,927.70.

National Mineral Co., Chicago, ammunition chest cranks, $1013.65.

National Tool Co., Cleveland, reamers, $10,625.

National Tube Co., Pittsburgh, shells, $1882.

National Twist Drill & Tool Co., Detroit, drills, $2123.16.

Nelpin Mfg. Co. Inc., Long Island City, N. Y., gages, $10,450.

New York Thread Grinding Corp., New York, gages, $23,725.

Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn., machine tools and lathes, $32,705.20.

Norma-Hoffman Bearings Corp., Stamford, Conn., ball bearings, $1646.04.

Offerman, L., Tool & Die Co., New York,

gages, $2303.
O. K. Tool Co. Inc., Shelton, Conn., cutters, $1907.20.
Otis Elevator Co., Buffalo, steel castings, $3729.63.
Pangborn Corp., Hagerstown, Md., blasting machines, $5553.
Penn Tool Co., Philadelphia, screwdrivers, $1323.
Peters Engineering Co., Philadelphia, machines, $7000.
Pipe Machinery Co., Cleveland, gages, $13,675.50.
Pittsburgh Water Heater Corp., Pittsburgh, fuzes, $497,798.
Poor & Co., Canton, O., forgings, $1267.75.
Porter-McLeod Machine Tool Co. Inc., Hatfield, Mass., lathes, $3487.
Putnam Tool Co., Detroit, counterbores and countersinks, $5065.
Quality Hardware & Machine Corp., Chicago, motor drives, $26,696.
Rathbone, A. B. & J., Palmer, Mass., steel, $12,862.50.
Read Machinery Co. Inc., York, Pa., preheaters, $15,050.
Red Jacket Mfg. Co., Davenport, Iowa, castings, $10,916.30.
Reed Mfg. Co., Erie, Pa., strap wrenches, $4568.40.
Reed Small Tool Works, Worcester, Mass., knurls, $1375.
Republic Steel Corp., Cleveland, steel, $5692.45.
Revere Copper & Brass Inc., New York, brass and strip rod, $1385.52.
Robbins & Myers Inc., Philadelphia, electric hoists, $2976.
Safe Guard Corp., Lansdale, Pa., gages, $5850.
Scaife, William B., & Sons Co., Oakmont, Pa., air tanks, $3923.40.
Scharoun Industries Inc., Pulaski, N. Y., jigs and fixtures, $1061.
Shipley, W. E., Co., Philadelphia, parts for automatic screw machine, $1543.
Simonds Saw & Steel Co., Boston, cutters, $2664.
Sipp-Eastwood Corp., Paterson, N. J., cutters, $6186.
S K F Industries Inc., Philadelphia, roller bearings, $3628.
Slocomb, J. T., Co., Providence, R. I., calipers, $1109.09.
Somerville Machine & Foundry Co., Somerville, Mass., castings, $1455.88.
South Bend Lathe Works, South Bend, Ind., lathes, $1884.80.
Sperry Gyroscope Co. Inc., Brooklyn, N. Y., differentials, spare parts, $7748.
Springfield Machine Tool Co., Springfield, O., engine lathes, $21,721.
Stanley Works, Stanley Tools Division, New Britain, Conn., bench clamp vises, $4860.
Stedfast & Roulston Inc., Boston, lathes, $1,353,182.
Stokes, F. J., Machine Co., Philadelphia, press machines, $2041.
Suburban-Essex Machinists Inc., Orange, N. J., inspection gages, $2209.
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis., parts for tanks, $1060.20.
Titan Metal Mfg. Co., Bellefonte, Pa., time train rings, for fuze, $96,600.
Titeflex Metal Hose Co., Newark, N. J., parts for tanks, conduit, $92,154.65.
Union Spring & Mfg. Co., New Kensington, Pa., steel springs, $1290.
United States Hoffman Machinery Corp., New York, vacuum conveying systems, $129,580.
Universal Fixture Corp., New York, steel shelving, $1452.20.
U. S. Rubber Co., Detroit, tanks and construction panels, $60,440.
U. S. Tool & Mfg. Co., Dearborn, Mich., milling cutters, $3540.
Vascoloy-Ramet Corp., Philadelphia, tools, $2929.
Vickers Inc., Detroit, oil hydraulic units, $4798.60.
Vinco Corp., Detroit, gages, $2016.
Wahn, George H., Co., Boston, conduit, $2827.47.
Waldron, John, Corp., New Brunswick, N. J., couplings, $4924.80.
Wallace Supplies Mfg. Co., Chicago, exhaust manifold assemblies, $1635.
Warner Electric Brake Mfg. Co., Beloit, Wis., brakes, $31,444.
Washburn Wire Co., New York, music wire, $2285.91.
Waterbury Clock Co., Waterbury, Conn., fuze bodies, $970,000.
Watson-Stillman Co., Roselle, N. J., presses, $6500.
Weaver, Frank M., & Co. Inc., Lansdale, Pa., steel, $4980.
Webb, Jervis B., Co., Detroit, fuze tray conveyor, $4160.
Weinstein, S., Supply Co., New York, hammers, $1420.09.
Willamette-Hyster Co., Peoria, Ill., guard winches, $1188.
Wood, Alan, Steel Co., Conshohocken, Pa., steel, $1102.38.
Wyckoff Drawn Steel Co., Pittsburgh, steel bar, $148,363.70.
Zimmerman Steel Co., Bettendorf, Iowa, castings, $19,029.70.

Corps of Engineers Awards

Anchor Post Fence Co., Baltimore, chain link fence with posts, gates, Bowman field, Louisville, Ky., $7173.50.
Aqua Systems Inc., New York, hydraulic gasoline distribution system, Presque Isle, Me., airport, $144,707.
Atchison, Topeka & Santa Fe Railway Co., Los Angeles, railroad spurs, Fresno air base, Fresno, Calif., $7200.
Barber-Greene Co., Aurora, Ill., ditchers, $18,810.
Barco Mfg. Co., Chicago, portable gasoline hammers, with accessories and spare parts, $6861.60.
Bethlehem Steel Co., Bethlehem, Pa., reinforcing steel, Bolling field, Anacostia, D. C., $3765.
Buda Co., Harvey, Ill., earth augers, $4506.46.
Buffalo-Springfield Roller Co., Washington, rollers, $37,625.
Danforth, Richard S., utility anchors, 35040.
Edwards Co., New York, railroad cars, $125,000.
Freyn Bros. Inc., Indianapolis, monorails and jib cranes, Fairfax aircraft assembly plant, Kansas City, Kans., $101,-:43.
Fuchs Machinery & Supply Co., Omaha, Nebr., universal angle plates, aircraft assembly plant, Ft. Crook, Nebraska, $2257.
Galion Iron Works & Mfg. Co., Galion, O., road graders, $107,271.
General Electric Supply Corp., Washington, electrical equipment, $2919.83.
Good Roads Machinery Corp., Kennett Square, Pa., aggregate spreaders, $2465.44.
Klein, J. B., Iron & Foundry Co., Oklahoma City, Okla., structural steel, Midwest Air depot, Oklahoma City, Okla., $1,208,400.
LeBlond, R. K., Machine Tool Co., Cincinnati, lathes, $2603.
LeTourneau, R. G., Inc., Peoria, Ill., tournacar welder, $10,686.
Majestic Mfg. Co., St. Louis, gas ranges, Lowry field, Denver, $5227.56.
Mercury Mfg. Co., Chicago, platform trailer trucks, $3790.
Paxton & Gallagher Co., Omaha, Nebr., stationary base machinists' vises, aircraft assembly plant, Ft. Crook, Nebraska, $15,624.75.
Pitman, J. C., & Sons Inc., Lynn, Mass., deep fat fryers, Lowry field, Denver, $2947.05.
Railway Accessories Co., Cincinnati, used tank cars, $9800.
Ransome Concrete Machinery Co., Dunellen, N. J., portable concrete mixers, $25,092.
Richardson-Wayland Electrical Corp., Roanoke, Va., underground cable, Langley field, Virginia, $10,500.
Rogers Bros. Corp., Albion, Pa., trailers, $34,640.
Savory Inc., Newark, N. J., gas toasters, Lowry field, Denver, $2250.30.
Smith Welding Equipment Corp., Minneapolis, repair parts for welding and cutting sets, $2085.89.
Sperry Gyroscope Co. Inc., Brooklyn, N. Y., parts for searchlights, $233,-C85.15.
Sullivan Machinery Co., New York, air compressors, $3612.
Twin Disc Clutch Co., Racine, Wis., repair parts for clutch, $2693.68.
Wallace & Tiernan Co. Inc., Belleville, N. J., repair parts for water purification units, $14,003.03.
Walton, Jack, Co., Houston, Tex., air corps oil storage system, Goodfellow field, San Angelo, Tex., $20,041.01.
Yale & Towne Mfg. Co., Philadelphia, crane and fork trucks, $13,187.50.

Quartermaster Corps Awards

Corona Sheet Metal Works, Corona, Calif., evaporative cooling systems, Mojave Desert antiaircraft range, near Barstow, Calif., $9160.
Diamond T Motor Car Co., Chicago, 4-ton trucks, $4,098,570.
General Excavator Co., Marion, O., crawler cranes, $34,120.
General Motors Corp., Chevrolet Division, Flint, Mich., ½-ton trucks, $195,021.20.
Pearce-Williams Contracting Co., Columbus, Ga., reservoir, Ft. Benning, Georgia, $36,200.
Shepard Niles Bridge Crane & Hoist Corp., Philadelphia, traveling 10-ton bridge crane in ordnance repair shop, Ft. Eustis, Virginia, $5690.

Signal Corps Awards

American Automatic Electric Sales Co., Chicago, braces, washers and screws, telephone equipment, $94,861.30.
Belmont Radio Corp., Chicago, radio equipment, $2,106,758.18.
Cornelius, H. M., Co., New York, tool equipment, fuzes, $1695.90.
General Electric Co., Radio & Television Department, Schenectady, N. Y., radio equipment, $14,669,142.
Joslyn Co., New York, brackets and carriage bolts, $12,275.
Link, Fred M., New York, radio equipment, $7160.
Mallory, P. R., & Co. Inc., New York, vibrators, $51,610.
RCA Mfg. Co., Camden, N. J., transmitters, oscillators and tubes, $209,520.24.
Seyler Mfg. Co., Pittsburgh, machine bolts, $11,912.50.
Triplett Electrical Instrument Co., Bluffton, O., test sets, $137,750.
Westinghouse Electric Supply Co., Chicago, shovels, spoons, bars, poles and climbers, $5538.50.

Chemical Warfare Service Awards

American Optical Co., Southbridge, Mass., respirators, $53,900.
Milcor Steel Co., Baltimore, galvanized iron, $2085.20.
National Stamping Co., Detroit, valve assembly outlet clamps, $21,200.

Air Corps Awards

Air Associates Inc., Bendix, N. J., nuts, $144,047.20.
American Brass Co., American Metal Hose Branch, Waterbury, Conn., flexible conduit, $58,511.
Bell Aircraft Corp., Buffalo, gun mount adapters, $522,632.40.
Bendix Aviation Corp., Bendix Products Division, South Bend, Ind., carburetor assemblies, $224,596.92.
Blackhawk Mfg. Co., Milwaukee, jack assemblies, $554,484.
Boeing Aircraft Co., Seattle, maintenance parts, $172,267.70.
Consolidated Aircraft Corp., San Diego, Calif., engine parts, $4,003,940.83.
Douglas Aircraft Co. Inc., Santa Monica, Calif., airplanes and spare parts, $6,-061,385.
Emerson Electric Mfg. Co., St. Louis, turret assemblies, $8,025,000.
Fairchild Engine & Airplane Corp., Ranger Aircraft Engines Division, Farmingdale, L. I., N. Y., engines and spare parts, $2,702,453.11.
Fay, J. A., & Egan Co., Cincinnati, woodworking machinery, $64,250.
Folmer Graflex Corp., Rochester, N. Y.,

aircraft cameras, $4,297,752.

Fyr-Fyter Co., Dayton, O., fire extinguishers, $139,397.76.

General Motors Corp., Delco Remy Division, Anderson, Ind., generator assemblies, $1,496,073; Allison Division, Indianapolis, engine parts, $8,197,052.48.

Gosiger, C. H., Machinery Co., Dayton, O., woodworking machinery, $8991.

Hart, Earle, Woodworking Machine Co., Chicago, woodworking machinery, $102,195.

Hickok Electrical Instrument Co., Cleveland, indicators, thermometers, $658,590.

Kinsey, E. A., Co., Cincinnati, horizontal milling machines, $50,455.50.

Lamson & Sessions Co., Cleveland, cotter pins, $90,552.11.

Leece-Neville Co., Cleveland, generator and panel assemblies, $1,704,250.

Lewis Engineering Co., Naugatuck, Conn., thermometer indicators, $538,488.

Lunkenheimer Co., Cincinnati, drain cocks, $22,437.50.

Martin, Glenn L., Co., Baltimore, tanks and fuel gages, $136,040.

Northrop Aircraft Inc., Hawthorne, Calif., airplanes and spare parts, $18,411,312.20.

Oliver Machinery Co., Grand Rapids, Mich., woodworking machinery, $17,896.

Oneida Ltd., Oneida, N. Y., bomb shackle assemblies, $114,030.

Osborne & Sexton Machinery Co., Columbus, O., woodworking machinery, $108,760.

Parker Appliance Co., Cleveland, nuts, $66,235.50.

Power, L., & Co., Philadelphia, woodworking machinery, $23,800.

Progressive Mfg. Co., Torrington, Conn., auger bits, $18,729.85.

Pump Engineering Service Corp., Cleveland, vacuum pump assemblies, $161,450.

Service Tool & Engineering Co., Dayton, O., sight assemblies, $383,520.

Sheldon, R. D., Co., Cincinnati, woodworking machinery, $24,650.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., electric hoists, $198,000.

Sparks-Withington Co., Jackson, Mich., mooring kits and signal assemblies, $522,901.

Vultee Aircraft Inc., Downey, Calif., airplanes, engines, propellers and spare parts, $13,428,483.37.

Weatherhead Co., Cleveland, drain cocks, $40,195.

Webster Electric Co., Racine, Wis., solenoid assemblies, $35,900.

Weinstein, S., Supply Co., New York, woodworking machinery, $11,440.

Westinghouse Electric & Mfg. Co., Dayton, O., generator assemblies, $685,000.

Wright Aeronautical Corp., Paterson, N. J., spare parts for engines, $53,140.65.

Yale & Towne Mfg. Co., Stamford, Conn., power driven fuel transfer pumps, $50,995.

Yates American Machine Co., Beloit, Wis., woodworking machinery, $222,879.64.

Defense Corp. Finances More Plant Expansions

■ War Department last week reported more lease agreements completed between Defense Plant Corp. and manufacturers for establishment of new facilities for production of equipment essential to the Army. Title to all facilities purchased and installed under the lease agreements will be retained by the Defense Corp. The agreements:

Bullard Co., Bridgeport, Conn., $1,900,000 for additional machinery and equipment to be used in manufacture of machine tools;

Parker Appliance Co., Cleveland, $432,230 for additional machinery and equipment to be used in aircraft equipment production;

Watson-Stillman Co., Roselle, N. J., $214,451 increase for additional machinery and equipment to be used for increased production of hydraulic equipment for the Ordnance Department;

Warner & Swasey Co., Cleveland, $550,000 for machinery and equip-

Sixty-Nine Pratt & Whitney Employes Receive Service Emblems

■ Sixty-nine gold service emblems were presented to employes of Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn., recently by President Clayton R. Burt. Pratt & Whitney recognizes 10, 20, 30, 40 and 50 or more years of service with solid gold pins carrying varying numbers of diamonds.

Two employes received 50-year pins, which carry one large diamond. They are William Hansen, in charge of fitters and scrapers in machine tool assembly, and Fred D. Shuster, estimating and layout department.

Men receiving 40-year pins were Carl Holmberg, Charles Ludwig, Christian Meyer, George Revoir, Richard D. Ryan, and Benjamin A. Boardman.

Those receiving 30-year pins were William Banning, Gerhard Erickson, William Hoffart, Frederick Howarth, Victor Johnson, Ludwig Kirschner, John McQueeney, William Schectman, Joseph Tracy and Carl Tillquist.

Those receiving 20-year pins were August Bloomquist, James Cassarino, Howard Clark, James Durkee, Earl Hout, Albert Meyers, Thomas Molloy, Nils Nelson, Arthur Peterson, Victor Saul, John Scherer, Joseph Stinson and George Hedling.

Those receiving 10-year pins were William Anderson, Roy Bentley, Austin Begay, Nelson Bishop, George Bixby, Henry Bozan, Otto Carlson, Charles Cotta, Jacob Cwikla, James Delany, Alpheus Delap, Arthur Dussault, Albert Eberly, Sigfrid Ek, Albert Hall, Herbert Hall, Charles Heath, Victor Holmquist, Bertil Johnson, Harry Karny, Oscar Levesque, Joseph Losty, Gustave Lundberg, Joseph Mincarelli, John Morgan, Earl Pelkey, Walter Petry, Anton Picha, Alexander Raden, Harry Rice, Phillip Rudy, Sylvester Schilling, Clinton Smith, Frank Stanish, Peter Staran, Otto Staehr, Carl Suneson, John Wood and Ralph E. McElroy.

ment for manufacture of machine tools;

Bell Aircraft Corp., Buffalo, $3,456,175 for a new plant at or near Wheatfield, N. Y., and purchase of equipment to be used in production of aircraft and aircraft parts;

General Motors Corp., Aeroproducts Division, Detroit, $11,453,128 for additional machinery and equipment to be installed in plants at Vandalia and Moraine, O., and to be used in manufacture of aircraft propellers and propeller parts; GM's New Departure Division, Detroit, $2,442,355 for machinery and equipment in a new plant to be erected at Bristol, Conn., to fabricate aircraft bearings; Chevrolet Division, Buffalo and Tonawanda, N. Y., $37,161,530 for acquisition and establishment of two plants at these locations, with machinery and equipment for manufacture of aeronautical engines and spare parts;

Curtiss-Wright Corp., Buffalo, $978,233 for enlarging facilities at Buffalo for manufacture of airplanes;

American Steel Foundries, Chicago, $9,413,901 for construction and equipment of a tank equipment plant at East Chicago, Ind. Machinery and engineering expenses are estimated at $5,562,709; land and buildings, $3,851,192;

Vickers Inc., Detroit, $541,722 for additional machinery and equipment in existing plant, to be used in production of hydraulic equipment for aircraft and artillery fire control;

Fafnir Bearing Co., New Britain, Conn., $746,062 for additional machinery and equipment to be used in existing plant for bearing production; and

Isolantite Inc., Belleville, N. J., $972,774 for construction and equipping of a new plant to be used in manufacture of ceramic products for the Signal Corps.

Defense Contract Opportunities . . . . .

■ CONTRACT Distribution Division, OPM, last week issued the following defense contract and subcontract opportunities through its district offices. Manufacturers with facilities capable of handling defense production, and not already fully engaged in that work, are thus afforded an opportunity to participate in the rearmament program.

Data on both prime and subcontracts are available at district offices, which usually have drawings and specifications for inspection. Bids on prime contracts, however, are to be sent directly to the contracting officers. Opportunities reported last week included:

Division of Contract Distribution, OPM, Federal Reserve Bank Building, Cleveland, asks for contractors for the following work.

1—401—Cleveland manufacturer requires machining and assembling facilities for screw machine manufacture. Necessary equipment includes gear cutting (steel) spurs, bevels, helicals, worms 2" to 10" P.D. up to 2" face; milling machines, vertical or horizontal; boring mills, drills, and grinders (internal and surface). Tolerances .0001 on some parts. Castings and gear blanks furnished. Representative blueprints on file in this office.

2—711—Massachusetts manufacturer wants subcontractors to manufacture 3-200" gear hobbers complete or in part. Will involve gray iron foundry castings up to 45 tons, annealing furnace to take castings 14' x 14' x 12'; also 20' vertical boring mill, 8' horizontal boring mill, 15' planer, 10" radial drill; also smaller equipment. Delivery requirement October with priority A-1-a rating. Tolerances very close. Representative blueprints on file in this office.

9—623—Cleveland manufacturer has work to subcontract on steel and aluminum parts for aircraft. Rough and finished machine drawings furnished for most parts and work may be subcontracted calling for rough finish only, if desired. Weight of parts ranges from 1.5 lbs. to 150 lbs. each. Most work requires boring, turning on heavy turret lathes, or boring and turning on vertical boring mill, milling machines, internal and external grinding, 4' radial drill press and heat treating facilities. Prints may be studied at this office.

10—729—Akron manufacturer has machine work to subcontract on small forgings; small milling machines and heat treating equipment needed. Die sinking facilities for forging dies urgently required.

11—729—Eastern Ohio manufacturer has to subcontract rough machining, heat treating and finish machining of alloy steel 3" face ring gears; 72" diameter. Also similar operations on cast steel segmental gear. Monthly requirements. Prints on file in this office.

12—801—Cleveland manufacturer has large quantity of steel forgings, approximately 3" diameter x 5½" long. Requirements: Rough turning; however, finished machining operations will be considered at a later date. Necessary equipment: Low swing lathes, or Sundstrand automatic.

16—804—Cleveland manufacturer desires to subcontract cutting and heat treating 20 degree helical gears. Sizes up to 12" O.D. Delivery requirements 800 pieces per month. Priority A-1-a.

17—728—Ohio manufacturer desires to subcontract the manufacture of fixtures for airplane wing assembly. This 30' structure made of structural steel sections and steel plate requires welders, shapers, drills, etc. Delivery requirements indefinite as yet. However, current requirements call for 62 for first operation. Blueprints on file in this office.

18—809—Western Ohio manufacturer desires to subcontract internal grinding operations on spindle bearings, gears, and small parts one to four inches in length. No. 81 Heald, No. 3 Bryant, or equivalent needed. Quantities to 5000. Blueprints may be studied in this office.

24—625—Cleveland manufacturer wants to subcontract metal stampings, ¼" plate 32" square. Will require press equipment, either hot or cold, 500-1000 tons capacity; both stampings and breaking operations. Nickel-chromium steel. Material can be furnished by subcontractor. Representative blueprints on file in this office.

27—825—Cleveland manufacturer wants subcontractors for chemical mortar barrels. Will require hydraulic press equipment, or die forgings. Operations consist of metal forming on one end (swaging or forging of end.) Material is seamless steel tubing. Prints on file in this office.

29—904—New Jersey manufacturer has work to subcontract on cutting thread studs, ⅜" to ⅝" diameter, 1" to 10" long. Necessary equipment includes multiple spindle automatics; centerless grinders and H & G threading machine equipped with double trip die head; heat treating equipment, Rockwell testing, cadmium plating, and polishing jacks; also, single spindle automatics. Material consists of alloy steel, furnished if necessary. Delivery will be continuous and in substantial amounts. Close tolerances. Has an A-1-a priority rating.

30—904—New Jersey manufacturer wants subcontractor to machine variety of parts from ½" to 2½" diameter, in lengths from ½" to 4". Necessary equipment includes multiple spindle automatic screw machines or turret lathes, grinding machines for internal, external, surface and centerless grinding; milling machines, honing equipment, surface analyzing equipment, and magnaflux testing equipment; thread millers and thread grinders. Material consists of alloy steel, and will be furnished if necessary. Close tolerances. Delivery will be continuous and in substantial amounts. Has an A-1-a priority rating.

37—911—Connecticut manufacturer requires subcontractors for perishable tools (punches, guide rings, dies, small parts) for making .30 caliber ammunition. Equipment will consist

Government Forms Are Available

■ Forms PD-73, PD-25-C, PD-25-D which now must be attached to every order or contract for defense supplies are available to STEEL's readers, shipments being made 24 hours after orders are received.

These forms can be obtained from STEEL, Readers' Service Department, Penton Building, Cleveland, at the following prices:

Quantity of		Quantity of	
100	$1.00	1,000	$3.55
200	$1.50	2,500- 5,000	$3.25 per M
300	$2.00	5,000-10,000	$2.95 per M
400	$2.50	10,000-20,000	$2.75 per M
500	$3.00	20,000 and over	$2.55 per M

NOTE: Postage is not included in above prices. If your order originates in Ohio, please include sales tax.

of small engine lathes or hand screw machines internal and external grinders, heat treating facilities. Operations of machine: Harden, draw, grind and tap. Materials of tool steel and drill rods not furnished. Tolerances are very close.

Bidding forms on any of these schedules should be obtained by wiring, mentioning schedule number, to the Bureau of Supplies and Accounts, Navy Department, Washington. QR refers to quantity required.

8803—steel, plate, marine, boiler. Misc. QR-large; bids Oct. 16.

3807—lathes, bench, 9 inches by 4 feet bed, motor driven. QR-7; bids Oct. 14.

8815—bronze and copper, ingots, QR-large.

8819—tractor, diesel engine driven, crawler type, complete with grading attachment. QR-1; bids Oct. 14.

8820—pig iron, foundry. QR-large; bids Oct. 16.

Division of Contract Distribution, OPM, 164 West Jackson boulevard, Chicago, asks for contractors for the following work:

CSC-922 There is a demand for facilities to produce propulsion equipment for boats. This material includes propeller shaft assemblies which consist of solid outboard propeller shafts and hollow inboard shafts, provided with flanges 21" in diameter. The shafts are 16¼" O.D. and 10⅞" I.D. There are flanges on both ends of the hollow shafts which are up to 21 feet long. Other shafts of this same assembly are 52½ and 43 feet long.

SWC-923 A Chicago manufacturer urgently requires work to be done on 6 RA-6 Gridley automatic screw machines, in quantities of 100,000 pieces of each of several parts, varying in size from ⅞" to 1". More work of the same type to follow.

AOG-926 An eastern manufacturer requires additional facilities for producing small gun parts. A battery of No. 3 or 4 vertical and horizontal milling machines, also deep hole boring equipment required. Lathes suitable for deep hole boring can be used. Workmanship must be accurate as close tolerances are involved.

EEC-913 A shop used to working within close tolerances and equipped with centerless and small cylindrical grinding facilities will find it to its advantage to investigate a job we have on hand to produce small parts about ¼" diameter by 1" long with a shoulder on each end. Quantities sufficiently large to permit a set-up. Drawings can be examined at this office.

SVF-918 An eastern prime contractor desires to locate production facilities for three items, as follows:

Item 1. ⅜" pipe thread stainless steel plugs in quantities of 10,000, 25,000, and 50,000.

Item 2. Stems made of stainless steel in quantities of 2500, 5000 and 10,000.

Item 3. Valve discs or seats made of stainless in lots of 2500, 5000 and 10,000.

As an alternative for item 2 and 3 of the above, they could be made of free machining monel metal. This material is to be used in connection with chemical appliances which carry a high priority.

Defense Contract Service, OPM, Pittsburgh, is seeking subcontractors to handle the following inquiries:

Reference RAC-16. One hundred rings of corrosion resistant steel (46-S-18) to be turned up to a diameter approximately 78 and 5/16 outside. Client will furnish the material. Sketch of piece available for inspection at this office.

Reference HOS-18. Heavy equipment required for 8" gear slide, 6' x 6' planer with 12' travel; 8" bar horizontal boring mill and similar equipment. Sketch available for review by qualified manufacturers.

Engineers' Defense Board To Study Shortages, Conservation, Substitution

■ ESTABLISHMENT of the Engineers' Defense Board, a new working organization of engineers and technologists from the several national engineering societies to deal with technical problems on shortages, substitutions, conservation, raw materials, production and reclamation in the nation-wide adjustment under impact of the defense effort, was announced last week.

With an initial membership of five representatives each appointed by the governing bodies of the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, Society of Automotive Engineers, and American Institute of Chemical Engineers, the new organization "will assist the various branches of government with engineering knowledge and experience on questions connected with military preparedness."

The board will function as a clearing house for the engineering professions on information dealing with defense, particularly in relation to shortages.

In many instances it is expected that the results will produce lasting benefit to the public as well as an immediate aid to defense. Membership:

American Society of Civil Engineers: Carlton S. Proctor, consulting engineer, executive committee representative; Richard E. Dougherty, vice president, improvements and developments, New York Central System; Charles F. Goodrich, chief engineer, American Bridge Co.; Robert R. McMath, chairman of the board, Motors Metal Mfg. Co.; J. P. H. Perry, vice president, Turner Construction Co.

American Institute of Mining and Metallurgical Engineers: John F. Thompson, executive vice president, International Nickel Co., executive committee representative; Zay Jeffries, technical director, lamp department, General Electric Co.; Wilber Judson, vice president, Texas Gulf Sulphur Co.; Frederick Laist, metallurgical manager, Anaconda Copper Mining Co.; Wilfred Sykes, president, Inland Steel Co..

American Society of Mechanical Engineers; R. M. Gates, president, Air Preheater Co., executive committee representative; H. V. Coes, industrial department, Ford, Bascon & Davis Inc.; K. H. Condit, dean of engineering, Princeton University; J. W. Parker, vice president and chief engineer, Detroit Edison Co.; W. R. Webster, chairman of board, Bridgeport Brass Co.

American Institute of Electrical Engineers: H. H. Barnes Jr., General Electric Co., executive committee representative; C. A. Adams, E. G. Budd Mfg. Co.; C. B. Jolliffe, Radio Corp. of America; R. L. Jones, Bell Telephone Laboratories; Phillips Sporn, vice president in Charge of engineering, American Gas & Electric Service Corp.

Society of Automotive Engineers: C. L. McCuen, vice president and chief engineer, General Motors Corp., executive committee representative; Rex B. Beisel, chief engineer, Vought-Sikorsky Aircraft Corp.; C. E. Frudden, Allis Chalmers Mfg. Co.; Arthur Nutt, vice president, Wright Aeronautical Corp.; James C. Zeder, chief engineer, Chrysler Corp.

American Institute of Chemical Engineers: F. W. Willard, president, Nassau Smelting & Refining Co., executive committee representative; Webster Jones, Carnegie Institute of Technology; R. L. Murray, vice president, Hooker Electrochemical Co.; A. J. Weith, manager of research, Bakelite Corp.; R. E. Wilson, president, Pan American Petroleum Transport Co.

Serving as officers of the Defense Board are Robert E. McConnell, OPM Consultant, chairman; Dr. Harry Rogers, president of Brooklyn Polytechnic Institute, vice chairman; and Dr. A. B. Parsons, secretary of the American Institute of Mining and Metallurgical Engineers, secretary.

New Flying Boat Dwarfs Army Bomber

■ **United States Navy's huge new flying boat, weighing 70 tons and powered by four 2000-horsepower engines, dwarfs the Martin B-26 two-motored Army bomber. Wheeled out of the Glenn L. Martin plant at Baltimore for the first time last week, the ship is claimed to be capable of flying nonstop across the Atlantic and back**

Canada Cuts Container Plate Tin Content 10%; Steel Orders Indexed

TORONTO, ONT.

■ EXTENDING Canada's wartime conservation program, Dominion canners have been instructed to use containers with reduced tin content wherever possible. Ten per cent reduction in the tin coating of containers for most foods has been declared feasible.

Standard plate, however, is to be continued for canning certain fruits, vegetables, specialties, juices, fish products, meats and meat products. Maximum use of substitutes has likewise been ordered, to further conserve essential war materials.

Use of rolled steel plate for manufacture of cigarette containers has been prohibited as another step in metals conservation.

Order was issued recently by F. B. Kilbourn, steel controller, setting up a system whereby consumption of steel in Canada will be indexed, that distribution may be guided into the requisite channels. It is imperative he declared, that accurate information be provided to make possible prior imports of those items most urgently required to meet shortages.

Form Must Accompany Orders

Steel producers are directed to secure from their customers, with each purchase order for any steel as defined in the official schedule, a complete statement on form SC-1000. No order is to be accepted henceforth unless it is duly covered by the form, nor shipments made on any unfilled order not so covered before Oct. 15.

Shipbuilding contracts placed in the past month by the Department of Munitions and Supply have comprised a large part of total war awards. Total for war and merchant vessels in the period was more than $61,000,000.

Contracts for war supplies placed in the week ended Sept. 16 totaled 3157, with combined value $40,859,-042. United States companies received awards totaling $457,774. West Coast Shipbuilding Co., Vancouver, B. C., received ship construction contracts aggregating $19,-537,200; Sorel Industries Ltd., Sorel, Que., $7,128,000 for heavy artillery guns; and Otis Fensom Elevator Co., Hamilton, Ont., $3,792,000 for munitions. Other awards:

Shipbuilding: West Coast Shipbuilding Co. Ltd., Vancouver, B. C., $19,537,200; Peterborough Canoe Co. Ltd., Peterborough, Ont., $35,364.

Dockyard supplies: National Electric Refrigerator Co. Ltd., Montmagny, Que., $82,770; Joliette Steel Co. Ltd., Joliette, Que., $12,046; Page-Hersey Tubes Ltd., Toronto, $20,520.

Land transport: International Harvester Co. Ltd., Ottawa, Ont., $641,891; General Motors Products of Canada Ltd., Oshawa, Ont., $28,849; Federal Equipment Co. Ltd., Chatham, Ont., $5470; Chrysler Corp. Ltd., Windsor, Ont., $25,-277; Ford Motor Co. of Canada Ltd., Windsor, $12,553.

Aircraft: Overseas Requisition, London, England, $63,504; Canadian Pratt & Whitney Aircraft Ltd., Longueuil, Que., $9477; Fairchild Aircraft Ltd., Longueuil, $9766; Aviation Electric Ltd., Montreal, Que., $19,893; Noorduyn Aviation Ltd., Montreal, $5579; Ottawa Car & Aircraft Ltd., Ottawa, $9028; Link Mfg. Co. Ltd., Gananoque, Ont., $635,701; Fleet Aircraft Ltd., Ft. Erie, Ont., $12,768; Chadwick-Carroll Brass & Fixtures Ltd., Hamilton, Ont., $9280; Macdonald Bros. Aircraft Ltd., Winnipeg, Man., $7059.

Instruments: Canadian Pratt & Whitney Aircraft Ltd., Longueuil, $6941; Instruments Ltd., Ottawa, $33,523; Ontario Hughes-Owens Co. Ltd., Ottawa, $280,012; Research Enterprises Ltd., Toronto, $14,-400.

Electrical equipment: Overseas Requisition, London, England, $12,000; Northern Electric Co. Ltd., Ottawa, $10,518.

Machinery: Canadian Ingersoll-Rand Ltd., Montreal, $29,243; Mussens Ltd., Montreal, $11,066; International Harvester Co. Ltd., Ottawa, $55,187.

Tools: F. Bacon Co. Ltd., Montreal, $33,-550; Canadian Fairbanks-Morse Co. Ltd., Ottawa, $6201; Dominion Twist Drill Ltd., Walkerville, Ont., $5473.

Ordnance: Gauthier & Julien, Portneuf Station, Que., $33,000; Dominion Engineering Works Ltd., Montreal, $218,000; Sorel Industries Ltd., Sorel, Que., $7,128,000; Canadian Locomotive Co. Ltd., Kingston, Ont., $217,728.

Munitions: Overseas Requisition, London, England, $50,215; Canadian Industries Ltd., Montreal, $12,135; Defence Industries Ltd., Montreal, $48,157; Dominion Arsenals Ltd., Ottawa, $275,360; Frost & Wood Ltd., Smiths Falls, Ont., $9765; Modern Moulding Metal Products, Toronto, $35,381; Otis Fensom Elevator Co. Ltd., Hamilton, $3,792,000.

Structural steel: Dominion Bridge Co. Ltd., Lachine, Que., $100,800; Central Bridge Co. Ltd., Trenton, Ont., $71,069.

Miscellaneous: Galt Malleable Iron Works Ltd., Galt, Ont., $22,499; Beatty Bros. Ltd., Fergus, Ont., $12,584; Safety Supply Co. Ltd., Toronto, $15,000; Stevens Chemical Products, Toronto, $13,-500; General Steel Wares Ltd., Ottawa, $5545; Metal Craft Co., Grimsby, Ont., $19,196; Walter Kidde Co. Ltd., Montreal, $86,344; Page Equipment & Construction Co., Three Rivers, $7295; Renfrew Electric & Refrigerator Co., Renfrew, Ont., $9900; Kraft Containers Ltd., Hamilton, $5257.

War construction projects: Carter-Halls-Aldinger Co. Ltd., Toronto, $2,290,-000; Johnson Bros. Construction Co., Brantford, Ont., $79,480; W. C. Brennan Contracting Co. Ltd., Hamilton, $63,160; Hill-Clark-Francis Ltd., New Liskeard, Ont., $114,130; M. F. Schurman Co., Charlottetown, P. E. I., $78,180; F. W. Flett, Cardston, Alta., $71,395; Russell Construction Co. Ltd., Toronto, $936,000; Fundy Construction Co., Halifax, N. S., $150,000; Waterman-Waterbury Mfg. Co. Ltd., Regina, Sask., $500,000; Couture & Toupin, Winnipeg, $64,000; Tomlinson Construction Co. Ltd., Toronto, $613,000; M. A. Condon & Son, Kentville, N. S., $416,000; Carter-Halls-Aldinger Co. Ltd., Vancouver, addition to Canadian Wright & British Engines Ltd., Vancouver, $190,-000; Milne & Nicholls, Toronto, addition to Research Enterprises Ltd., Leaside, Ont., $480,000.

Brookings Finds Price Control Bill Inadequate

■ Twenty-one per cent rise in wholesale prices during the past two years is ascribed chiefly to increases in the prices of agricultural products and to higher hourly wages in a study released last week by the Brookings Institution, Washington.

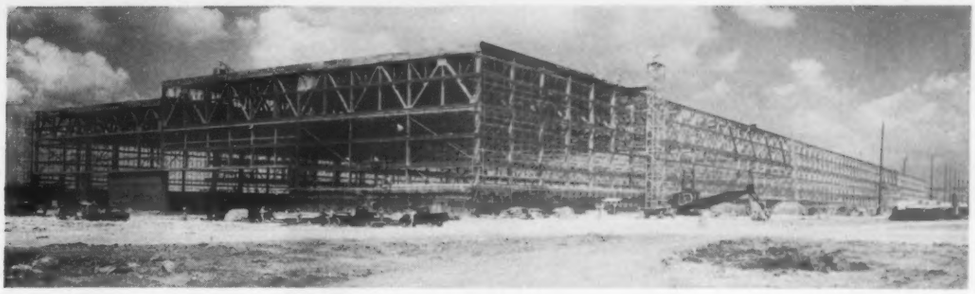
Agricultural price rises, the study found, have been due primarily to government policy, and not conditions of supply and demand. Effect of these policies is cumulative, and already is resulting in an upward spiral of costs and prices with disastrous effects on large segments of the population.

The agricultural price rise of about one-third in the year ended June 30 is contrasted with the relatively small advances in other important commodities, such as metals and metal products which lie at the center of defense demands.

Manufacturing corporations have not "profiteered" during the defense period; they have not advanced prices as compared with the cost of raw materials and labor. Wholesale prices of manufactured goods have advanced only about three-fourths as much as hourly wage rates and less than half as much as raw material costs.

"The official price control bill now before Congress," the study continues, "is not focused on the primary factors in price advances, but on control in subsequent stages, and therefore can have only a limited effect. All the price administrator can do is to try to prevent the rises in manufacturing and distributing prices from being excessive. He is faced with the impossible task of restraining prices throughout the economy, although primary elements of costs are not only uncontrolled, but are actually being pushed upward."

■ Service medals were recently awarded 63 veteran employes of the Joliet, Ill., plants of American Steel & Wire Co., subsidiary of United States Steel Corp., at a dinner in their honor in Joliet. Length of service ranged from 25 to 50 years, and represented a combined total of 1995 years.



■ With 11,000 tons of the 27,000-ton structural steel framework for the windowless bomber assembly plant in Fort Worth in place and a portion of the 4000-foot long assembly shop under roof, work was started last week on the shatter-proof side walls. (See illustration below). The same plans are used in the plant's "double" at Tulsa

73,000 Tons of Steel, 406 Carloads of Glass Fiber in Two Shatter-Proof, Bomber Assembly Plants

Blackout buildings 4000 feet long encased in metal . . . Windowless, but using more glass than largest daylight factories . . . Unique construction

■ A new type of shatter-proof, noncombustible side wall and roof construction combining three types of glass fiber and prefabricated steel panels is being used to insure insulation and acoustical control for working efficiency in the twin 4000-foot long army bomber assembly plants being erected at Fort Worth, Tex., and Tulsa, Okla.

Engineers of the Austin Co., Cleveland, who designed both plants, evolved the combination which utilizes products developed by Truscon Steel Co. Youngstown, O., and Owens-Corning Fiberglas Corp., Newark, O., in an entirely new approach to the task of insulating vast factory areas for economical year-round air conditioning.

With a total of 406 carloads of fiberglas required for these jobs—203 carloads for each plant—they will probably contain more glass in their windowless steel side walls and roof than the largest daylight factories ever built. By blanketing all interiors with several layers of these materials, which are calculated to eliminate or control all condensation and to reduce heat transference to a practical minimum, the cooling load has been substantially reduced.

Task for Steel Fabricators

The plants are so large, however, that each requires 7000 tons of refrigeration, enough to operate more than a quarter million large household refrigerators — which is more cooling than that installed for all the central air conditioning systems at Rockefeller Center.

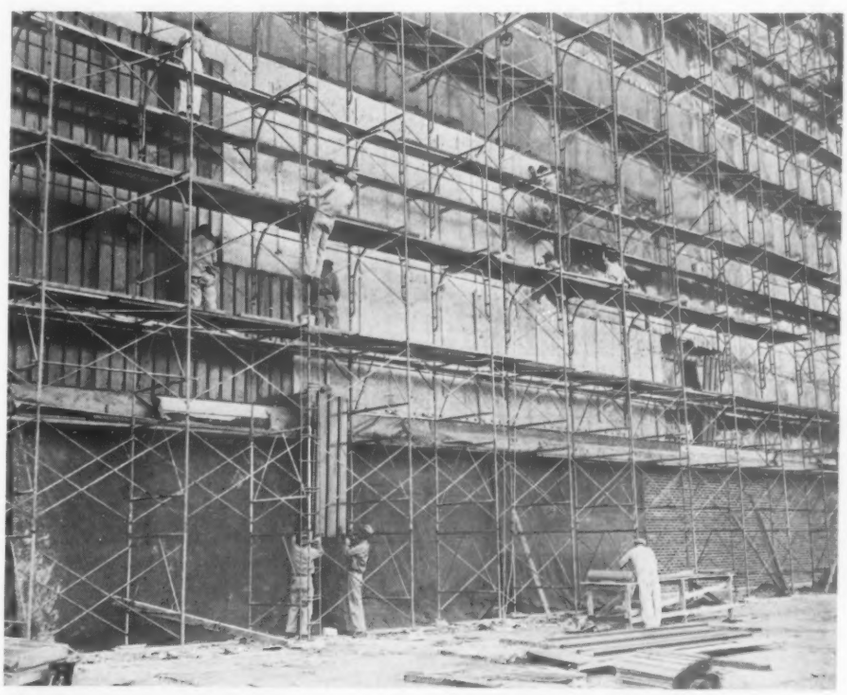
Notable for their size alone, these bomber plants serve to indicate the scope of the factory building program now under way from coast to coast to meet demands of the national defense.

Each will be large enough "to accommodate 33 super-theaters, with stages and a seating capacity of more than 213,000 persons on one floor."

Both plants are being built for the War Department under direction of the United States Corps of Engineers.

The 27,000 tons of structural steel required for each plant was more than any single steel mill or fabricating shop could deliver in the limited time allowed. Bethlehem Steel was able to meet the required schedule on steel for Fort Worth, however, by distributing this work among seven of its plants at different locations. Several companies have co-operated in production of the steel for Tulsa, which is being fabricated under a contract with the Midland Structural Steel Co., Chicago, in 17 shops throughout the Mississippi Valley and the Southwest.

Because all of the 171 200-foot



■ Sixty-five-foot shatter-proof insulated wall of steel and fiberglas erected with aid of tubular metal scaffolding. This view shows a small portion of a 4000-foot long windowless wall, with cellular steel channel sections forming the interior wall already in place in the upper section and on the right. Fiberglas board which provides exterior insulation is shown in the center of this wall area

■ White glass wool will blanket roofs and walls at bomber assembly plants. Runner channels, which are welded to steel purlins, 33 inches on centers, support the ⅜-inch ribbed expanded metal lath on which is spread a thin light reflecting mat of fiberglas, and a 3-inch blanket of white fiberglas for sound absorption and insulation. This in turn is covered by a metal deck, sections of which serve as temporary working platform. Fiberglas insulating board and several layers of special roofing materials are applied over this. Construction of side walls is similar, except that outer covering consists of ribbed steel sheets, painted

trusses required for the main aisle of each plant are 25 feet deep and an equal number of 120-foot trusses for the side aisle, 16 feet deep—all too high for shipment of any completed segments by rail—they are being assembled entirely on the site. While most of these spans weigh 40 tons and 25 tons and can be assembled on the ground and raised into place in one piece, 115-ton jack trusses of 200-foot span are being assembled in place with the aid of heavy falsework.

Only one 200-foot hangar door opening has been provided in each plant, that being at the end of the assembly line. These doors, and eight 200-foot doors in the nearby Hangar building, will be of the Truscon vertical lift type, installed in units of 100 feet wide to operate independently of each other. Four 150-foot single unit doors of the same type will be used in the paint shop. All will be 40 feet high and insulated in a manner comparable with the side walls.

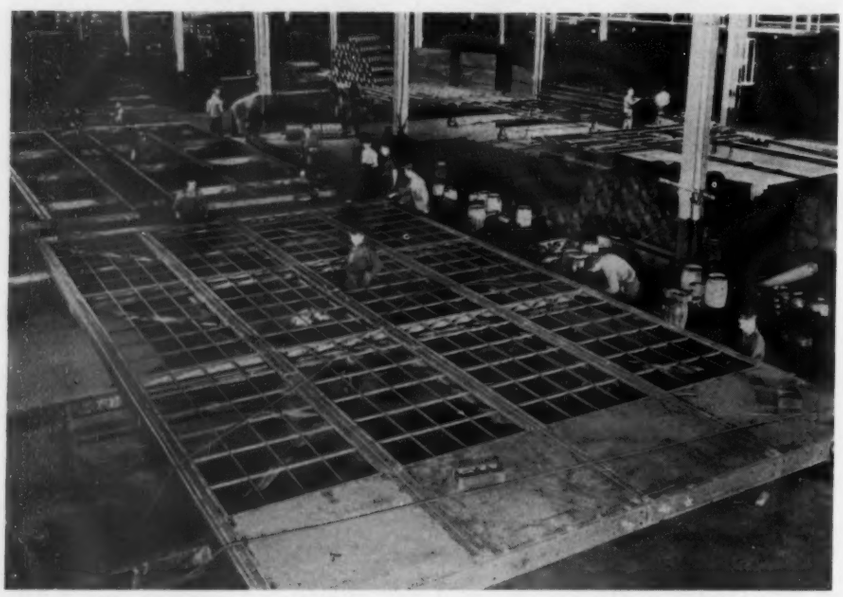
The assembly buildings and a majority of the auxiliary structures at each plant have an overall height of 65 feet. A 13-inch curtain wall of face brick and acoustic block, which is being specially reinforced with trussed rods to make it shatter-proof, rises to a height of 12 feet around the base of all buildings. The special insulated metal wall extends from that point to the roof. Fiberglas insulation board continues right down to the base of all walls through the masonry in order to insure absolute control of condensation. Even the bolts used to anchor the upper walls to steel girts are being insulated to prevent any continuous steel contact between exterior and interior.

By blanketing the interior walls of each structure with white fiberglas, the engineers have not only provided for insulation and absorption of between 60 and 75 per cent of all factory and office noises, but have also obtained a light-reflecting surface "which will maintain brightness at a high level." Each assembly building will have 17,000 two-tube 200-watt rectified (RF) fluorescent units recently developed by General Electric Co. for high bays, to provide at least 35 foot-candles at the working plane in continuous service. A white cement floor will enhance the general lighting efficiency by reflectiug light up on the underside of parts and planes on the assembly lines.

Each plant has been designed with two mezzanine levels alongside the assembly line. Nothing will obstruct the free operation of the interconnecting monorail systems which will serve the entire area of each assembly building. They will be capable of carrying a fully assembled 4-engine bomber the entire length of the 4000-foot assembly aisle where 40-foot clearance has been maintained, or transferring other overhead loads up to 20 tons between any two points in the 1,294,000-square-foot building area.

Bombers will progress through the final stages of assembly on parallel conveyors extending nearly 2000 feet through the assembly aisles, every portion of which will be served by a network of power lines in some ten miles of underfloor service duct.

Over and above the 27,000 tons of structural steel there will be approximately 4460 tons of sheet steel in the sidewalls and roof, 1000 tons in the doors, also 4000 tons of reinforcing steel in floors and foundation, or more than 73,000 tons for the two plants.



■ Assembling leaf of huge vertical lift type steel hangar door for the army bomber plants. Eighteen 200-foot doors which will be installed in units 100 feet wide, and four 150-foot single unit doors of this type will be required for the two bomber assembly plants being erected at Fort Worth and Tulsa

Mountain Town Turns Out with Two Bands When Furnace Is Relighted

RIDDLESBURG, PA.

■ RELIGHTING of the Riddlesburg Coal & Iron Co.'s blast furnace here Sept. 27 brings to this tiny mountain town of several hundred inhabitants its first industrial payroll since 1937.

The stack, formerly the Colonial blast furnace, was leased, with supporting coke ovens and coal mines, by the Riddlesburg company from the Reconstruction Finance Corp. Property has been completely rehabilitated and coal mines and coke ovens have been operating for some weeks past.

The furnace will produce about 6000 tons of No. 2 foundry iron monthly, which probably will be shipped to the Burlington, N. J., cast iron pipe foundry of the United States Pipe & Foundry Co., of which the Riddlesburg company is a wholly owned subsidiary.

When the furnace, mines and coke ovens were closed in 1937, skilled blast furnace men and others left to obtain employment at other stacks. Most were back, however, to witness the relighting. Residents for miles around turned out, with two bands, to welcome a seven-car special train from Philadelphia carrying officials and guests to the reopening ceremonies.

Furnace currently is operating on lake ore, but melting of West Virginia ore later is being considered.

The blast furnace, coal mines, and coke ovens will supply employment to approximately 325. Primary purpose of United States Pipe & Foundry Co. in initiating the project was to insure a dependable supply of pig iron for its Burlington foundry.

Officers of the Riddlesburg company are: N. F. S. Russell, chairman of the board; Thomas W. Kennedy, manager; Frank J. Kennedy, superintendent; Don H. Tyson, secretary and treasurer; J. K. Hiltner, traffic manager.

Baldwin Works Trains 1000 Machine Operators

■ More than 1000 skilled machine tool operators have been trained in the school-shop of Baldwin Locomotive Works, Philadelphia, in less than a year, it was reported last week. Given specialized instruction and training in operation of one type of machine, these men are working on tanks, antiaircraft gun mounts and gun barrels, and railway gun mounts.

Introduced in mid-October last year, the school-shop was so successful that by November it was operated on a 3-shift, 24-hours per day basis. Later arrangements were made for "pre-employment" instruction to be given in schools of Philadelphia and its environs through state employment offices.

After a period of preliminary instruction, the trainees receive an intensive course at the Baldwin schoolshop. They are immediately put to work in the plant as helpers, and eventually become full-fledged operators of various machines.

Cleveland Cap Screw Co. Observes 25th Birthday

■ Cleveland Cap Screw Co., 2917 East Seventy-ninth street, Cleveland, observed the twenty-fifth anniversary of its founding Sept. 29 with a dinner dance for office employes, foremen and other employes. At the celebration, Joseph W. Fribley, president, announced an expansion program to cost approximately $250,000, including a new building of $73,000, and new equipment. A similar program was completed in October, 1939.

Mr. Fribley and Charles M. Prell, treasurer, organized the F-P Screw Co. in 1916, and in 1921 changed the corporate name to Cleveland Cap Screw Co. From a modest beginning in rented space, with only a few employes, the company has grown to well known importance, occupying its own modern offices and factory and employing 300.

Home Building Seen as Post-War Stimulant

■ National campaign to keep the public informed of trends and improvements in housing development was announced last week by Revere Copper & Brass Inc., New York, through C. Donald Dallas, president. Mr. Dallas believes widespread residential construction will be one of the most important factors in offsetting unemployment and industrial slack after the war.

"Involved as we are in the present emergency, we still have to think about the world of tomorrow," said Mr. Dallas. "Revere is going to conduct this campaign nationally by means of advertising and free booklets embodying what leading authorities in the field have to say about 'better living' in the future."

At Riddlesburg Relighting Ceremony

■ **Front row, left to right: D. B. Stokes, vice president, United States Pipe & Foundry Co.; Mrs. D. B. Stokes; N. F. S. Russell, president, Pipe & Foundry; Mrs. N. F. S. Russell; T. W. Kennedy, manager, Riddlesburg Coal & Iron Co.; D. P. Hopkins, vice president, Pipe & Foundry; Mrs. D. H. Tyson; Frank J. Kennedy, superintendent, Riddlesburg.**

Back row, left to right: W. T. C. Carpenter, vice president, Pipe & Foundry; George W. Cobb and F. S. Gordon, directors, Pipe & Foundry; Mrs. D. P. Hopkins; H. Vinton Overholt, director and D. H. Tyson, secretary, treasurer, Pipe & Foundry

STEEL

Sinister War-Time "Reforms"

■ AMONG the trial balloons sent up from Washington in recent weeks two stand out as important.

The first was Secretary Morgenthau's suggestion that all profits in excess of 6 per cent on invested capital be taxed 100 per cent during the period of emergency.

The second was President Roosevelt's proposal that the social security system be extended to cover millions of domestic and farm workers and that the present deductions from employes and employers be increased sharply.

No one can argue with some of the reasons advanced for these proposals. The secretary of the treasury is on sound ground when he says that excessive profits from the defense program should be curbed. The President is talking sense when he says that purchasing power should be restrained to hold inflationary tendencies in check.

Unfortunately, these motives are not as pure as they seem. The elements of danger in both proposals are so numerous and so weighted with far-reaching adverse implications that they should be considered carefully from every angle before they are adopted.

• • •

The idea of taxing profits in excess of 6 per cent at the rate of 100 per cent for a year or two might not prove disastrous in itself. Everybody knows that it is desirable to pay as much as possible of the cost of war now and to reduce to the minimum the deferred payments for future generations.

But, taken in conjunction with other policies of the present government administration, Mr. Morgenthau's proposal does not look much like a revenue-producing scheme. It looks more like another punitive move against private enterprise.

If the New Deal government had been fair to private enterprise since 1933, the limit of 6 per cent on profits could be looked upon without suspicion. However, in the light of the repeated assaults upon private enterprise during nine years, it must be construed as another raid.

This is particularly true in view of the fact that our present tax structure already is more vicious in its punitive effect upon business than are the tax systems of Great Britain and Canada—nations which are actually at war.

• • •

A similar charge of insincerity can be voiced against the President's proposal. Social security in itself is commendable. To extend it would be desirable, if we could believe that the real objectives are to extend its benefits and to check inflation.

But here again we are assailed by doubts —doubts very similar to those which surround Mr. Morgenthau's idea.

The Roosevelt plan would put every gainful worker in a position to live off of government checks during part of his life. The Morgenthau plan would put numerous companies out of business or place them on what would amount to government relief.

Do we wish to rush "whole hog" toward a totalitarian state?

These proposals, unless carefully safeguarded, would hasten our march to that unhappy end.

E. L. Shaner

EDITOR-IN-CHIEF

Oct. 6, 1941

The *BUSINESS TREND*

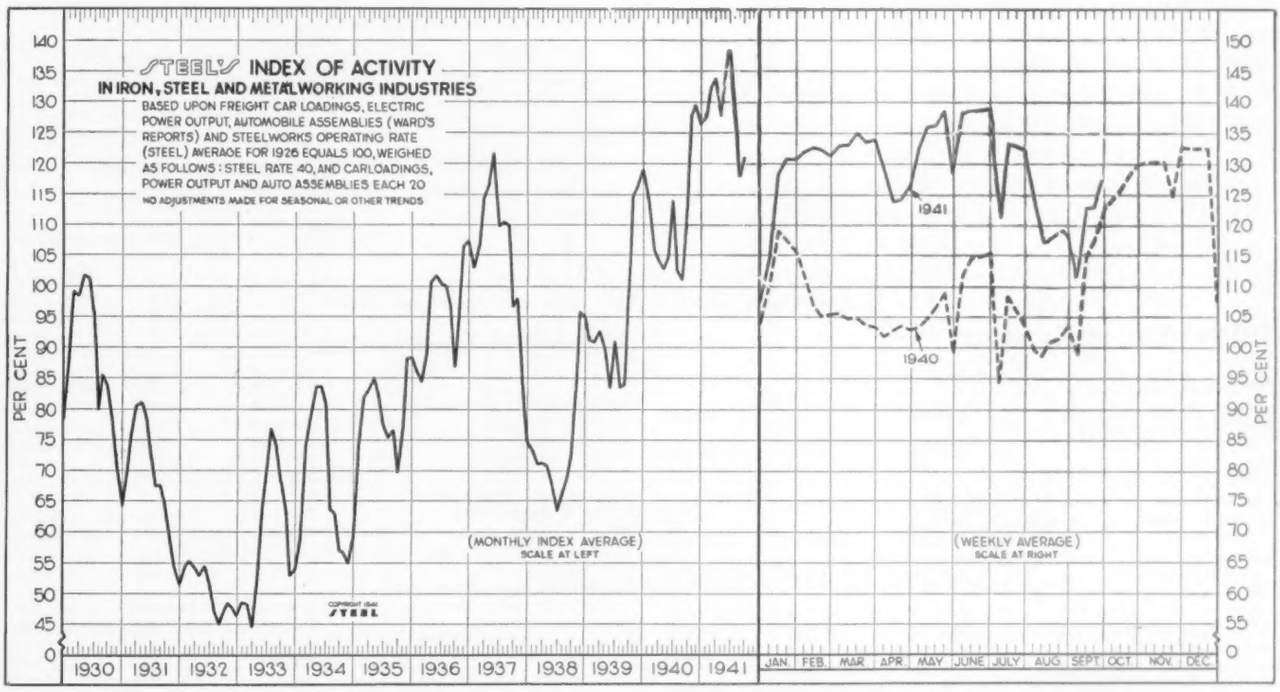
September Index Average Records Moderate Gain

■ ACTIVITY in the iron, steel and metalworking industries improved moderately during September. STEEL'S weekly index averaged 121.1 last month, a gain of 3 points over the August figure of 118.1. The comparatively low level recorded by the index during August and September is accounted for principally by the seasonally reduced volume of automobile production. In September last year the index averaged 113.5, while the peak this year was 138.7 recorded during June.

For the week ended Sept. 27 the index climbed 4.6 points to 127.5, reflecting an increase in electric power consumption, automobile production and revenue freight traffic.

A recent survey completed by the National Association of Manufacturers indicates some three million persons now employed in non-defense jobs face partial or total unemployment in the course of the next 6 months. This would mean one-fourth of the 12.5 million employed in manufacturing industries would be in need of work.

Price Administrator Henderson recently warned that the American people will have "to pull in their belts" because industry is beginning to throw the full


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100, WEIGHED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
(MONTHLY INDEX AVERAGE) SCALE AT LEFT
(WEEKLY AVERAGE) SCALE AT RIGHT
1941
1940
1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

STEEL'S index of activity gained 4.6 points to 127.5 in the week ended Sept. 27:

Week Ended	1941	1940
July 5	120.9	94.2
July 12	133.4	108.5
July 19	133.2	106.0
July 26	132.9	103.4
Aug. 2	123.3	99.7
Aug. 9	117.5	98.4
Aug. 16	118.2	100.8
Aug. 23	118.5	101.4
Aug. 30	118.2	103.5
Sept. 6	111.8	98.7
Sept. 13	122.3	114.9
Sept. 20	122.9	124.4
Sept. 27	127.5	122.8

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	121.1	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	...	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	...	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	...	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3

weight of its productive capacity into the battle of democracy, with the squeeze of priorities a consequent reaction, especially on non-defense lines. William S. Knudsen, director general of OPM, predicts that a lower standard of living and longer working hours are just ahead for this country under the national rearmament program.

Defense goods and exports are now taking about 20 per cent of the total output of processed goods, compared with 11 per cent a year ago. It is estimated that a year from now the proportion of output represented by defense goods and exports may well be nearly one-third of the total industrial production.

Consumer purchasing power is still expanding. National income this year is expected to reach $85 to $90 billion, against $76 billion last year. Rising volume of purchasing power in the face of diminishing supplies of numerous consumer goods is exerting considerable pressure on the commodity price level. The extent to which increased taxes and purchases of defense saving bonds will offset this condition remains to be seen.

During the latest week revenue freight carloadings advanced to the highest level this year, totaling 919,510 cars. Electric power consumption recovered some of the ground lost in the preceding week although it remained below the peak recorded to date this year. Automobile production moved upward seasonally to 78,535 units during the week ended Sept. 27, but so far has failed to match the week-by-week 1941 new model output recorded this time a year ago.

Steelmaking operations held steady at 96 per cent during the week of Sept. 27, compared with 93 per cent recorded in the same 1940 period. Despite falling off in new bookings during September, steel producing interests report little headway has been made against the large order backlogs accumulated in the preceding months.

Where Business Stands

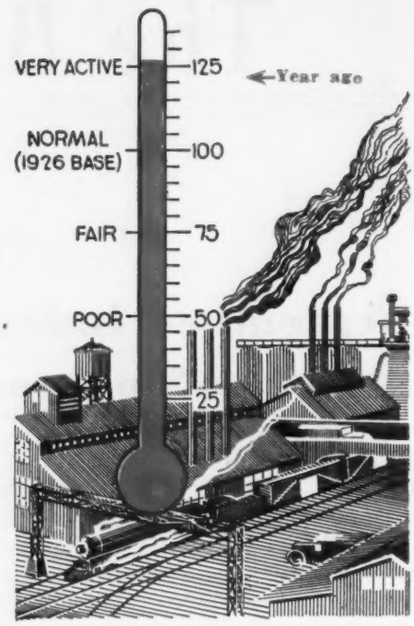
Monthly Averages, 1940 = 100

	Aug., 1941	July 1941	Aug., 1940
Steel Ingot Output	123.3	120.4	109.0
Pig Iron Output	120.5	120.0	106.6
Building Construction	227.8	173.0	124.3
Auto Output	42.1	119.9	23.0
Freight Movement	128.4	122.9	106.4
Wholesale Prices	115.3	112.6	98.6

Industrial Weather

TREND:

Sidewise



The Barometer of Business

Industrial Indicators

	Aug., 1941	July, 1941	Aug., 1940
Pig iron output (daily average, tons)	154,343	153,749	136,399
Iron and steel scrap consumption (tons)	4,518,000	4,415,000	3,968,000
Gear Sales Index	276	298	191
Foundry equipment new order index	312.9	358.1	165.4
Finished steel shipments (Net tons)	1,753,665	1,666,667	1,455,604
Ingot output (average weekly; net tons)	1,580,351	1,543,367	1,396,475
Dodge bldg. awards in 37 states ($ Valuation)	$760,233,000	$577,392,000	$414,941,000
Automobile output	164,792	468,767	89,866
Coal output, tons	45,650,000	43,300,000	39,010,000
Business failures; number	954	908	1,128
Business failures; liabilities	$11,134,000	$13,422,000	$12,997,000
Nat'l Ind. Conf. board (25 industries, factory):†			
Av. wkly. hrs. per worker	41.0	41.7	38.1
Av. weekly earnings	$33.70	$34.26	$28.16
Cement production, bbls.†	16,000,000	15,222,000	12,290,000
Cotton consumption bales	874,113	928,943	654,503
Car loadings (weekly av.)	897,848	859,298	743,670

†July, June and July respectively.

Foreign Trade

	July, 1941	June, 1941	July, 1940
Exports	$358,649,000	$329,737,000	$316,696,000
Imports	$277,847,000	$279,536,000	$232,393,000
Gold exports	$13,000	$7,000	$8,000
Gold imports	$37,055,000	$30,719,000	$519,983,000

Financial Indicators

	Aug., 1941	July, 1941	Aug., 1940
30 Industrial Stocks‡	126.67	127.57	125.32
20 Rail stocks‡	30.19	29.60	26.83
15 Utilities‡	18.50	18.48	22.22
Bank clearings (000 omitted)	$30,063,451	$31,584,855	$23,361,074
Commercial paper rate (N. Y., per cent)	½–⅝	½–⅝	½–⅝
*Com'l. loans (000 omitted)	$10,903,000	$10,572,000	$8,509,000
Federal Reserve ratio (per cent)	91.0	91.0	89.3
Federal Gross debt (millions of dollars)	$50,923	$49,513	$43,909
Railroad earnings	$106,312,000	$93,269,000	$57,725,000
Stock sales, New York stock exchange	10,874,650	17,872,807	7,616,050
Bond sales, par value† ($1,000,000)	$189.2	$149.6	$98.1

†July, June and July respectively.
*Leading member banks Federal Reserve System.
‡Dow-Jones averages.

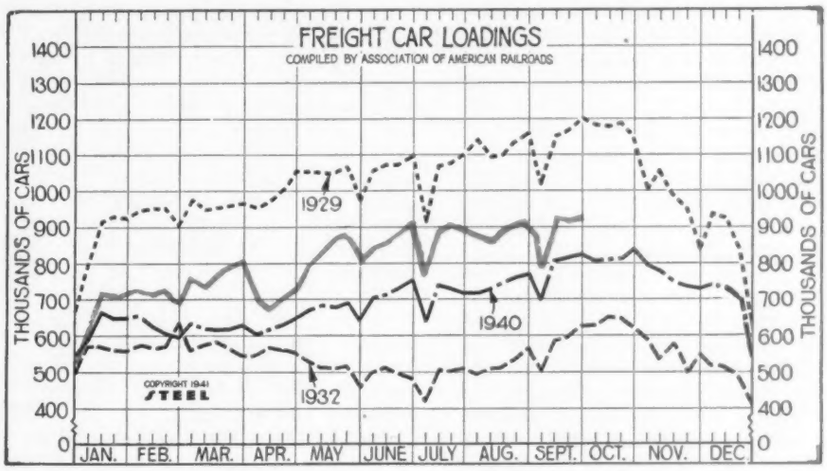
Commodity Prices

	Aug., 1941	July, 1941	Aug., 1940
STEEL'S composite average of 25 iron & steel prices	$38.15	$38.15	$37.70
U. S. Bureau of Labor's index	90.3	88.8	77.4
Wheat, cash (bushel)	$0.735	$1.04	$1.14
Corn, cash (bushel)	$0.648	$0.86	$0.845

Steel Ingot Operations

(Per Cent)

Week ended	1941	1940	1939	1938
Sept. 27....	96.0	93.0	84.0	47.0
Sept. 20....	96.0	93.0	79.5	48.0
Sept. 13....	96.5	93.0	74.0	46.0
Sept. 6....	95.5	82.0	62.0	41.5
Aug. 30....	96.5	91.5	64.0	44.5
Aug. 23....	96.0	90.5	63.5	43.5
Aug. 16....	95.5	90.0	63.5	41.5
Aug. 9....	96.0	90.5	62.0	40.0
Aug. 2....	97.5	90.5	60.0	40.0
July 26....	96.0	89.5	60.0	37.0
July 19....	95.0	88.0	56.5	36.0
July 12....	95.0	88.0	50.5	32.0
July 5....	92.0	75.0	42.0	24.0
June 28....	99.5	89.0	54.0	28.0
June 21....	99.0	88.0	54.5	28.0
June 14....	99.0	86.0	52.5	27.0
June 7....	99.0	81.5	53.5	25.5



Freight Car Loadings

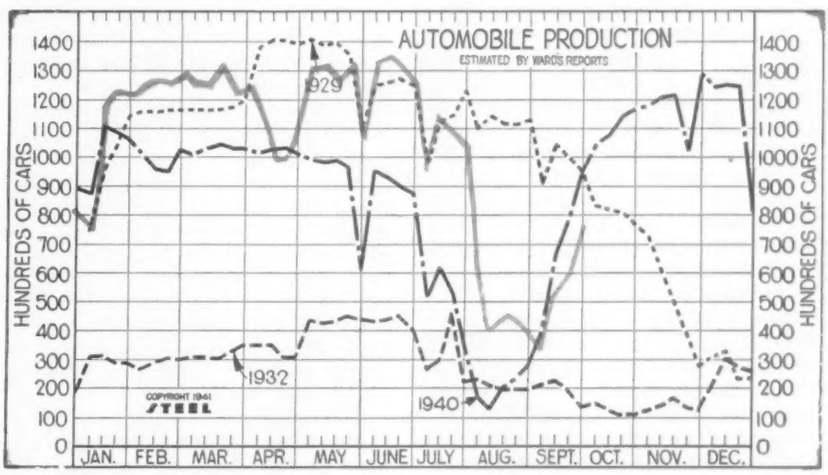
(1000 Cars)

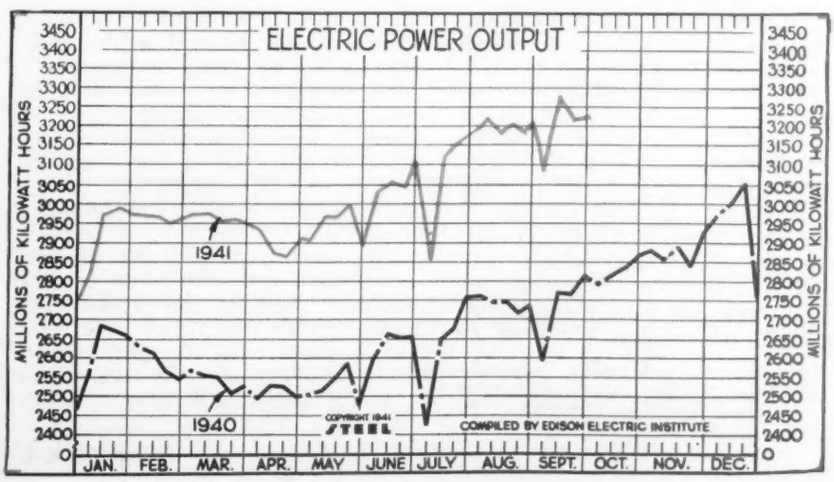
Week ended	1941	1940	1939	1938
Sept. 27.....	920	822	835	698
Sept. 20.....	908	813	815	676
Sept. 13.....	914	804	806	660
Sept. 6.....	798	695	667	569
Aug. 30.....	912	769	722	648
Aug. 23.....	900	761	689	621
Aug. 16.....	890	743	674	598
Aug. 9.....	879	727	665	590
Aug. 2.....	883	718	661	584
July 26.....	897	718	660	589
July 19.....	899	730	656	581
July 12.....	876	740	674	602
July 5.....	740	636	559	501
June 28.....	909	752	666	589
June 21.....	886	728	643	559
June 14.....	863	712	638	556
June 7.....	853	703	635	554

Auto Production

(1000 Units)

Week ended	1941	1940	1939	1938
Sept. 27....	78.5	96.0	62.8	25.4
Sept. 20....	60.6	78.8	54.0	20.4
Sept. 13....	53.2	66.6	41.2	16.1
Sept. 6....	32.9	39.7	26.9	17.5
Aug. 30....	40.0	27.6	25.2	22.2
Aug. 23....	45.5	23.7	17.5	18.7
Aug. 16....	45.6	20.5	13.0	23.9
Aug. 9....	41.8	12.6	24.9	13.8
Aug. 2....	62.1	17.4	28.3	14.8
July 26....	105.6	34.8	40.6	30.4
July 19....	109.9	53.0	47.4	32.1
July 12....	114.3	65.2	61.6	42.0
July 5....	96.5	52.0	42.8	25.4
June 28....	127.9	87.6	70.7	40.9
June 21....	133.6	90.1	81.1	40.9
June 14....	134.7	93.6	78.3	41.8
June 7....	133.6	95.6	65.3	40.2




ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1941
1940
COPYRIGHT 1941 STEEL
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Electric Power Output †

(Million KWH)

Week ended	1941	1940	1939	1938
Sept. 27.....	3,233	2,816	2,559	2,208
Sept. 20.....	3,232	2,769	2,538	2,211
Sept. 13.....	3,281	2,773	2,532	2,279
Sept. 6.....	3,096	2,592	2,376	2,110
Aug. 30.....	3,224	2,736	2,442	2,217
Aug. 23.....	2,193	2,714	2,434	2,202
Aug. 16.....	3,201	2,746	2,454	2,207
Aug. 9.....	3,196	2,743	2,414	2,198
Aug. 2.....	3,226	2,762	2,400	2,194
July 26.....	3,184	2,761	2,427	2,160
July 19.....	3,163	2,681	2,295	2,085
July 12.....	3,141	2,652	2,403	2,154
July 5.....	2,870	2,425	2,145	1,937

†New series: Includes additional governmental and power generation not previously reported.

IRON POWDER

. . . . some notes on its production, use and future prospects

By A. H. ALLEN
Detroit Editor, STEEL

■ AT THE outset, the distinction between powdered iron and sponge iron should be emphasized. Sponge iron is reduced direct from ore and may be in granular form or in large chunks, with varying degrees of purity. It has a variety of uses, such as melting stock, a synthetic wrought iron base, cement waterproofing material and the like, or it may be powdered and purified for use in the powdered metal products industry.

In contrast, powdered iron may be produced mechanically from a blast-furnace reduced iron, or it may be reduced from various iron oxides such as mill scale or the "synthesized" oxides free from gangue or other impurities. The powdered metal products industry is practically convinced that suitable iron powder, of, say, unvarying 99 per cent Fe content, cannot be made from ore and therefore must be prepared from scale, pig iron, scrap or other ferrous wastes.

The Methods Tried

Many processes for direct reduction of iron ore to produce a sponge iron have been tried:

The by-product coke oven type of furnace.

The horizontal or inclined cylindrical rotary kiln.

The horizontal cylindrical steel tube with internal transport screw.

Various types of electric resistance furnaces.

Rotary hearth muffle furnaces including: a. Circular hearth, heated with fuel combusted in silicon carbide tubes; b. annular hearth, similarly heated; c. circular hearth, heated with fuel burned above a silicon carbide tile-arch sprung over the hearth. (All three of these with carbonaceous solids or gases, or both, as reducing agents).

These methods were aimed at producing a sponge iron and not a high-purity powdered iron. They go back at least 25 years to the days when about the only discovered value of iron powder was as a precipitant for copper from copper sulphate solution in the treatment of oxide-sulphide copper ores. All of the methods listed showed some advantages and while often appearing practicable in the laboratory state, eventually were beset by such production difficulties as sticking in the reduction chamber, incomplete reduction, etc.

In recent years, several other methods have been proposed, some of them directed more specifically toward the iron powder market, as follows:

1. Production of sponge iron in special horizontal furnaces with reducing atmospheres of cracked gas or hydrogen. Several plants are operating in the United States under this process and are producing powdered sponge iron from scale or oxides in quantities as high as 10,000 pounds a day.

2. A vertical externally heated retort through which preheated iron ore is showered and is reduced during its fall, to be collected at the base either in a melting furnace or other "suitable receptacle."

3. A vertical reduction tube, contents heated by electric induction, into which roasted iron ore is fed, being reduced as it descends the tube, by means of a reducing gas being forced upward through the descending ore. Resulting product is a sponge iron which can be powdered or not as desired. Proposals have been active on the West Coast for a plant of this type for some time, seeking to realize advantages of low-cost ore, natural gas and electric power.

4. Low-temperature reduction of ore in a pressure vessel by subjecting preheated ore to pulsating surges of natural gas in a pressure vessel. Reduction temperature is said to be around 140 degrees Fahr. and gas pressures build up to a peak of 50 pounds per square inch. A plant operating under this process has been designed for early operation in the East Texas district, producing reduced iron in varying degrees of purity and fineness.

5. Preparation of iron powder by the carbonyl process, involving passage of CO gas over iron particles at 350 degrees Fahr. forming liquid iron carbonyl ($Fe(CO)_5$), weighing 12 pounds to the gallon, which can subsequently be separated by heat to pure iron and CO gas. Iron carbonyl itself has been used as an anti-knock fluid for gasoline and for desulphurization of oils.

6. Various electrolytic methods for production of iron powders of high purity, using principally ferrous wastes (scrap, oxides, mill scale, etc.) as the starting material.

7. Powder has been made experimentally by melting pig iron or scrap in a cupola, pouring the hot metal into a bessemer converter and blowing the carbon down to the 0.10-0.50 range. The converter then is tipped and after removal of slag, the metal blown against a rotating steel wheel in a shotting tank. Resulting products are small, porous disks, the larger of which can be crushed in an impact hammer mill. Surfaces of the solidified iron are oxidized and the interior of pellets, disks, etc., is lower in carbon content than the melt. A deoxidizing anneal gives some decarburization and yields a powder of surface structure claimed to be ideal for compressing and sintering.

Proponents of the low-temperature or direct reduction of iron ore to sponge iron have had their eyes on the "tonnage" market of competition with blast furnace metal. Thus, the East Texas chamber of commerce comments on method No. 3 as follows:

"Iron can be made from East Texas ore much cheaper by (this) process than by the blast furnace process and probably for a fuel cost of about one-fourth and a plant investment of about one-eighth compared with the blast furnace method now in use."

In the field of high-purity iron powder, as stated previously, users have come to the general recognition that the best product for their use is that prepared from "synthetic" oxides or mill scale; or direct from metals such as pig iron and scrap steel. The intimate association of iron ore with its siliceous gangue, easily severed in the blast furnace, is not easily broken down by low-temperature reduction methods and magnetic separation, and appears to be the primary stumbling block in the way of direct-reduced iron powder of uniform high purity for the powdered metal products industry.

Of course, given an iron oxide free from silica and with more or less uniform analysis, the problems of reduction are simplified. At least two methods have been proposed to yield such oxides. One uses waste pickling liquors as the starting prod-

From presentation made at conference on Powder metallurgy at Massachusetts Institute of Technology, Cambridge, Mass.

uct, from which ferrous sulphate is crystallized and then broken down into iron oxide and sulphurous gases, the latter suitable for further use in such things as sulphuric acid manufacture. The geographical location of such a plant might be a determining factor in its success.

The second method is the production of iron oxide as a by-product in the manufacture of sulphuric acid from pyrites by the chlorine method. By this method gaseous ferric chloride and sulphurous gases are evolved. The condensed chloride is broken down into iron oxide and free chlorine, the latter then reused. In making the chlorine, hydrogen is produced and it can be utilized for reduction of the oxide. The cycle, while appearing complicated is reported to be economical. Furthermore, there are large quantities of iron pyrites both in this country and in Canada available for such a reduction process. Geography again is a consideration.

The principal drawback to the more extensive use of iron powder today is the problem of obtaining high purity at a reasonable price. For example, one user states that material of 99 per cent purity at 12 cents a pound would be more economical than a material showing 96 per cent Fe at 8 cents a pound. And there are applications pending for parts which would use several million pounds a year of material with 96 per cent purity at a price of 5 cents a pound. Current production, incidentally, is estimated to call for about 15,000 pounds of iron powder a day.

Must Consider Purity and Price

Eventually it is believed powdered iron will be produced in several grades, somewhat as follows:

Purity of 99 per cent or better for use in bearings, electrical products and other parts requiring high quality but comparatively moderate tonnage.

Purity of 96 to 99 per cent for numerous types of machine parts, where volume is larger and cost must be lower.

Purity of less than 96 per cent for parts of less strict requirements and still lower material cost.

Lower degrees of purity for applications where impurities may be welcome.

In addition to purity and price, several other qualities are desirable in an iron powder for optimum compressing and sintering operations. This may be grouped under the general heading of controlled uniformity of physical characteristics, from the following standpoints:

Size of particles: as near 250 mesh as possible is suggested.

Shape of particles: irregular, sharp cornered, spongy are preferred.

Hardness of particles: softness and malleability are primary requisites.

Controlled uniformity of these characteristics naturally leads to uniform density of powder, an essential in die pressing; and also provides a material with maximum flowability under pressure.

An interesting offshoot of the synthetic powder angle is in the work of Herman Tormyn, engineer with Chevrolet Gear & Axle Division in Detroit. He has worked with iron powders for many years in an experimental way, but until he conceived the idea of starting with steel scrap instead of powder he did not realize much commercial success.

Now, Tormyn has perfected a method of taking SAE X-1112 steel turnings originating in Chevrolet machining operations, putting them through a swing-hammer crusher, loading them into a die in a 30-ton press which compacts the turnings to the approximate shape of a finished part, then "sintering" the pieces in a controlled-atmosphere furnace at 1875 degrees Fahr., hot pressing, quenching, cold trimming and cold coining.

Obtains Increased Production

The piece so produced is a bearing lock sleeve about 3 inches in diameter, about ⅝-inch thick, and weighing 8 ounces. It supplants a former gray cast iron sleeve which had to be machined on the outside rim and the two faces. The new method avoids all machining, and production on a single equipment set-up has run as high as 500 per hour. With expenditure of about $30,000 for equipment, a saving of 2 cents each on the former piece price of 4½ cents was realized. On a yearly production of 1,350,000 units, close to what Chevrolet produced in the 1941 model, indicated savings would be $27,000. Extension of the process to other parts is considered quite likely.

Transition from a peacetime to a wartime economy is not without its benefits to the powder metal industry, since it minimizes the importance of cost as a determining factor in the choice of materials. Already numerous parts of compacted metal powders are being fitted into the defense equipment picture, both in ordnance and aviation engine and propeller fields.

Concurrently, the shortages in strategic and critical materials occasioned by demands of the defense program have opened the way to a number of "alternate" or "optional" materials for parts used in such industries as automotive, refrigerator, household equipment, radio, etc. Pressed powdered iron parts come within this category and while there has been no marked specification of powdered iron as an alternate material so far, this may come. For example, brake cylinder pistons in automobiles, hitherto aluminum die castings, have been mentioned as a possibility for iron, the only difficulty being that there is a corrosion problem present, so despite fabricating advantages iron does not appear exactly suited to this application.

As only one example of current practice in the powdered metal bearings field, the Amplex Division of Chrysler Corp., which has been in production of iron-base bearings and parts since 1931, reports it is now supplying such bearings with a capacity of 60,000 pounds per square inch static load, and for heavier duty application, a bearing capable of supporting 150,000 pounds per square inch load.

Advantages and Disadvantages

Looking beyond the present emergency it is perhaps pertinent to draw up a balance of advantageous and disadvantageous factors which will have an important part in charting the course of powdered iron in the future. Principal advantages are:

Ability to produce parts to close tolerances, on the order of 0.001-inch, thereby dispensing with the need for such machining, conserving metal, machine tools, cutting tools, floor space and man hours, and speeding production at attractive cost savings.

Ability to prelubricate parts of powdered metal to an extent not possible in any type of competing metal parts.

Improved resistance to wear shown by many parts of powdered metal, compared with castings, forgings and rolled steel.

Possibility of eventually saving on cost over castings or forgings, as a result of factor No. 1, but controlled by original cost of the powder which as yet is still somewhat too high to suggest competition on a price basis.

Possibility of producing alloy iron and alloy steel powders, with the qualities of these metals in the melted and fabricated state, but without going through the melting stage.

Against these are a number of limiting factors:

Restrictions on sizes and shapes of parts which can be produced in dies because of the fact iron powder will not flow to any appreciable extent in a die as will molten metal or heated blanks in forging. To a certain extent this can be overcome by proper die design, but the problem of maintaining uniform density throughout a section is still left, calling for careful study of length-to-section-thickness ratios, etc.

High cost of tools and excessive wear thereon.

Limited tonnages of iron powder available commercially and comparatively high cost of powder sufficiently pure for compacting and sintering.

(*Please turn to Page* 90)

The GARAND semi-automatic RIFLE

. . . . . and its manufacture at Springfield Armory

Read of the early forms of hand cannon, development of methods of ignition, poachers invention of the hammer action, early efforts to load at the breech, invention of the pin fire cartridge, percussion type rifled musket, first bolt action magazine rifles, procedures followed by the Ordnance Department in developing the army rifle, the two principal methods of automatic action, advantages of gas action as explained by Mr. Garand, answer to cylinder fouling, and others

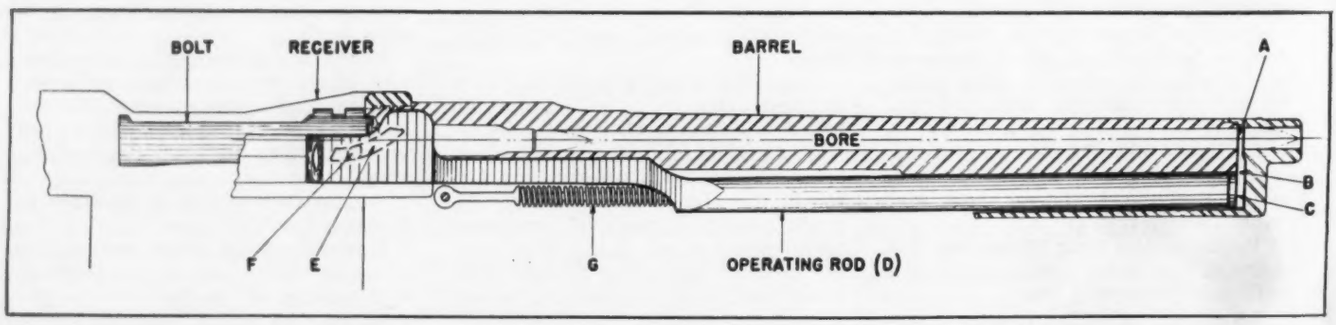
This Is Number 32 In a Series on Ordnance and Its Production, Prepared for STEEL *by Professor Macconochie*

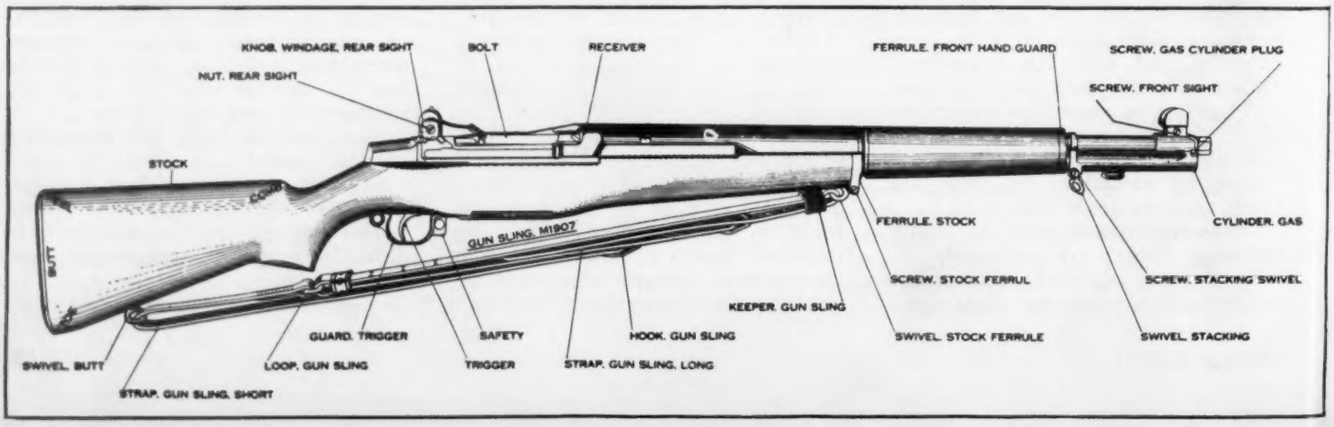
■ SPRINGFIELD Armory, where the modern United States rifle, caliber .30 Ml (or Garand as it is familiarly known) was born, has a long and honorable history. Established amid the storms and stresses attendant upon the birth of the republic, it has manufactured 41 successive models of firearms and has pioneered in the development of interchangeability of parts, a concept now accepted as one of the great basic inventions. Thus the armory might have been expected to make yet another contribution to small arms history in the new rifle which has become standard equipment for our rapidly growing army.

Amid its small beginnings in the latter part of the eighteenth century, cannon appear to have been made here and repairs carried out to muskets and other ordnance materiel. We seldom, by the way, use the word "musket" any more, and few people are aware that it was originally a large and heavy arquebus (or harquebus), first used in Italy about 1530 and in France and England about 1570. Customarily guns then were named after animals or birds, the musket being called after the male young of the sparrow hawk or the musket. Similarly, a "falconette", a gun reference that has practically disappeared. These early "muskets" were smooth bore weapons, since rifling was only patented in England in 1635. But the idea had already occurred to the early bowmen, who arranged the feathers on their shafts in a spiral in order to impart rotary motion to the arrow in flight.

Fig. 1—(Upper Illustration)—Diagrammatic sketch of a portion of the Garand semi-automatic service rifle showing the main principle of operation—the diversion of gas through the slot A to chamber B where it drives piston C to eject the spent cartridge, reload and cock the gun automatically. Operator must press trigger each time he wants to fire a shot

Fig. 2—(Lower Illustration)—Main exterior parts of the Garand: Of course provision is made for mounting a bayonet on the muzzle. Rear sight is entirely new in principle, is a great improvement. Mounted on rear port of receiver, aperture is close to the eye. The longer sight radius thus provided makes possible better marksmanship





By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.
and
Contributing Editor, STEEL

Thus, by the time the arsenal had started its official existence (1794), the art of small arms manufacture was some 400 or 500 years old, since primitive forms of hand cannon made their appearance in Europe early in the fourteenth century, and how much earlier in China we do not know. Contrary to the general impression which credits the Chinese with the invention but not the warlike application of gunpowder, a very early form of Chinese hand cannon having a bore of about 1½ inches and a barrel 25½ inches long is known. This weapon, like the early forms of European portable arms, was too heavy to shoot from the shoulder. But progress in the direction of weight reduction was rapid, and we know of an early form of matchlock which could be fired by a strong man. It had about a ¾-inch bore and a barrel 47½ inches long.

During the decade or more preceding the close of the Civil war, the armory had grown considerably, and the title of "musket" or perhaps "rifle musket" had given place to "rifle" or occasionally "carbine".

In the meantime, means of ignition also had advanced from the primitive practice of applying a lighted match to the touch hole, to the matchlock which was standard practice in small arm design for over 200 years, until the invention of the wheel lock in Germany in the early part of the sixteenth century. Colvin and Viall in their excellent work "United States Rifles and Machine Guns" relate that the hammer action was invented by poachers who, not wishing to betray their movements by the matchlock, and being too poor to purchase the wheel lock, employed a hammer to strike a piece of pyrites. This arrangement is the immediate parent of the flintlock and is supposed to date from 1508.

The original model of the first musket made by the United States government was the French model of 1736 supplied to this country during the American Revolution. This was followed by a flintlock musket having a smooth bore. In

Fig. 3—(Below)—Main interior parts of the Garand: Speed of disassembly usually evokes amazement from even experienced riflemen. Trigger-guard group, stock, operating rod and bolt can be removed in only 12 seconds

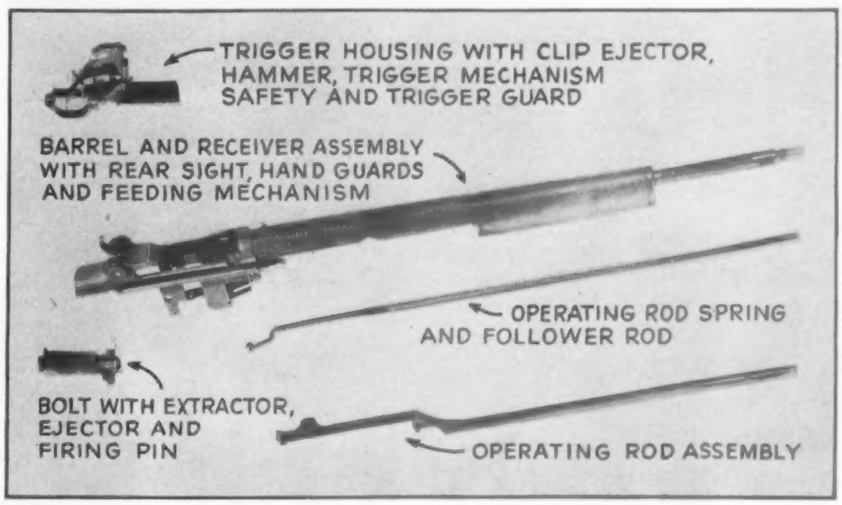
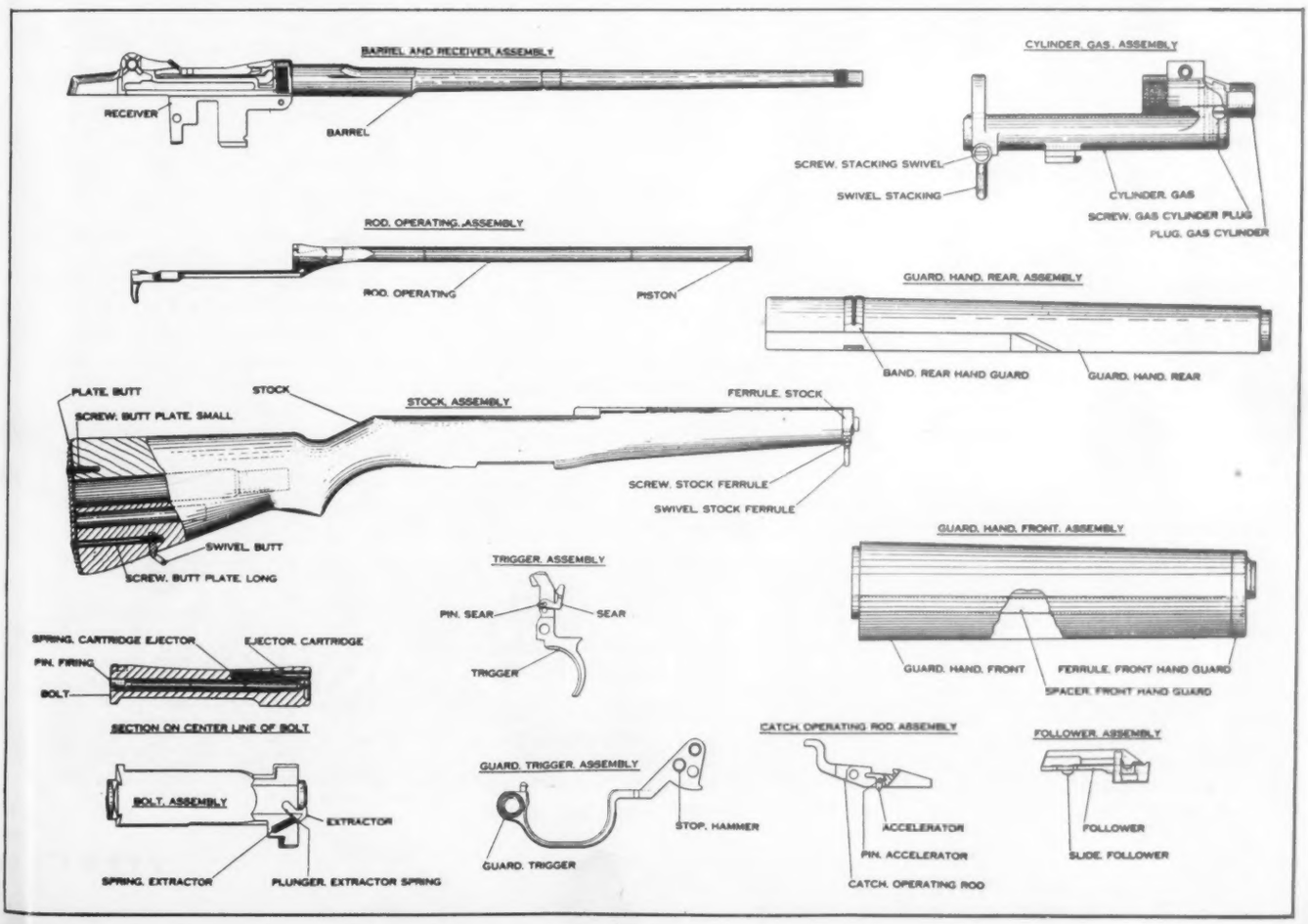

TRIGGER HOUSING WITH CLIP EJECTOR, HAMMER, TRIGGER MECHANISM SAFETY AND TRIGGER GUARD
BARREL AND RECEIVER ASSEMBLY WITH REAR SIGHT, HAND GUARDS AND FEEDING MECHANISM
OPERATING ROD SPRING AND FOLLOWER ROD
BOLT WITH EXTRACTOR, EJECTOR AND FIRING PIN
OPERATING ROD ASSEMBLY

Fig. 4 — (Immediate Right) — Various subassemblies that go to make up the Garand semi-automatic rifle



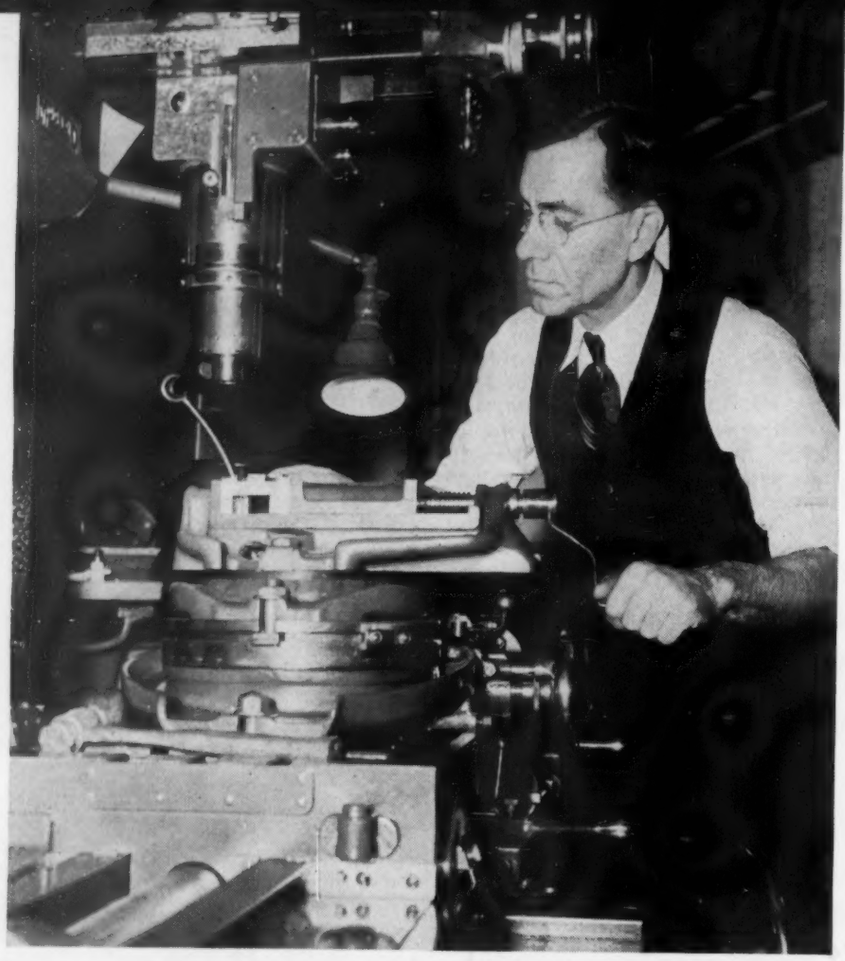


Fig. 5—John C. Garand, inventor of the rifle that bears his name, at work in his experimental shop at the Springfield Armory. OEM photo by Palmer

the model of 1822, percussion ignition had been adopted, but it was not until 1865 apparently that the Springfield breech loader made its appearance. Strangely enough, breech loading with its obvious advantages, had been more or less successfully applied some 300 years before as numerous specimens in various museums and especially in the British museum testify. The principal difficulty encountered appears to have been the escape of the gas past the breech, but this is a problem which appears to present no insuperable difficulty. At least it has since been solved successfully in all guns of large caliber which do not use fixed ammunition.

In this country, the first breech loading gun to be manufactured was invented and patented in 1811 by John H. Hall of North Yarmouth. About a hundred of these guns were issued to a company of riflemen in 1816, although the gun was never, apparently, adopted officially by the United States Army. Breech loaders of this type were used to a considerable extent in the Black Hawk and Seminole wars, and quite a number were employed in the Civil war. The extent of the recognition accorded to Hall seems to have been a grant of $10,000 made in 1836 on the basis of $1 per gun made up to that time, the total cost of the gun being $20. From all evidences, Yankee ingenuity was once more in the van, since we appear to have been the first country to use breech loaders for military purposes.

Meantime methods of ignition had still further improved. The year 1836 saw the invention of the pinfire cartridge by Lefaucheux. This was made of thin brass and paper and had a pin projecting through the side of the case which, on being struck, fired a cap inside. In a comprehensive article on "Springfield Arms" which appeared in the July-August (1939) issue of *Army Ordnance*, Captain Clifford A. Miller notes that the first percussion lock musket appeared in 1837—a smoothbore weapon.

By 1842 the percussion-type rifled musket had been adopted; and in 1855 the so-called tape lock or Maynard primer had become standard practice. This Maynard primer consisted of a flat tape with caps at intervals, not unlike the system used on some modern toy automatic pistols. The tape was wound on a small drum and the caps fed one at a time over a small nipple. The first breechloading rifle with the pin in the block appeared in 1866, and the first bolt action magazine rifle made its debut in 1892, nearly 30 years later, to be followed closely by several improved models which culminated in the light, small caliber magazine-fed rifle known as the Krag-Jorgensen.

In 1903, the basic design of that year's model was taken from the Mauser and combined with the carbine and characteristics of the model of 1898 to produce what has come to be known as the Springfield rifle —a weapon which in the opinion of many competent observers has had no equal in the world.

Such then is the environment in which the new army rifle was developed and is now being manufactured. Before analyzing the Garand, it might be well to summarize those objectives which guide the Ordnance Department in its research and development work. The army rifle, it should be remembered, is not only the descendant of the musket but also of the pike. In other words, besides being of moderate bulk and weight and well-balanced for accuracy of fire, it must be serviceable in hand to hand combat and so provides for attaching the bayonet.

Conditions under which the gun may be called upon to operate are perhaps as bad as ever encountered by any mechanism. Mud and dirt of any or all kinds may and does foul the working parts. Add exposure in all weathers and rough treatment at the hands of the soldier. Too, the army rifle must be simple in design and possess maximum interchangeability. If this were not enough, it must sustain its accuracy and serviceability over long periods and must be capable of being manufactured by the equipment available in time of emergency.

These are what might be termed the basic necessities. The conditions of modern warfare, however, have imposed the extreme desirability of greater rate of fire. This has been handsomely attained for whereas the Springfield could fire some eight or ten aimed shots a minute in the hands of a skilled marksman, the Garand rifle is capable of perhaps 30 shots a minute under similar conditions, and a burst of eight shots can be fired in a fraction over a second.

These requirements are not new. If we pause for a moment to review the long upward climb from the primitive hand cannon of the fourteenth century to the modern Garand, we observe the continual striving toward "fire power" and "mo-

The author thanks Mr. John C. Garand for his valuable assistance in preparation of this article; and expresses his appreciation for the helpful contributions of Jones & Lamson Machine Co., Springfield, Vt.; Pratt & Whitney Division of Niles Bement Pond Co., West Hartford, Conn.; the United States Ordnance Department; United States Office for Emergency Management—in providing many of the illustrations.

This account of the manufacture of shoulder arms at Springfield Armory is presented by kind permission of the United States Chief of Ordnance.

A. F. M.

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Fig. 6—Automatic equipment for heat treating gun parts at Springfield Armory. Note mesh belt conveyors for continuous movement of the work through the various processing sections which are set in straight line to facilitate handling operations. OEM photo by Palmer

bility" as expressed in terms of the rate at which shots can be delivered and the portability of the weapon and its ammunition. Among these various milestones we note the important part played by the concept of breech loading, as the muzzle loading Austrians found to their cost in their brief war with Germany in 1866. Then the ease and rapidity of ignition, culminating in the modern central fire percussion cap has had a profound influence on the world's destiny.

Next in historical sequence and made possible by the development of the breech loader and the metallic cartridge comes the magazine rifle of the sixties and seventies of which perhaps the most successful was that due to James Lee who employed a box magazine in which the cartridges were held one above the other directly below the bolt which pushed home the round on the forward stroke and ejected the spent cartridge on retreat. The fundamental difference between the Garand and all its long list of predecessors consists in the automatic accomplishment of this latter act, the soldier having nothing to do but push in a clip of cartridges and keep pulling the trigger until the magazine is empty.

There are two principal methods by which automatic ejection can be accomplished: One depends upon the energy of the moving barrel in its recoil. The other utilizes the exploding gas, while still under pressure in the bore, to drive a small piston. Machine guns, which are distinguished from semiautomatic rifles in that the gun fires as long as the trigger is held back, depend largely on the recoil of the moving barrel. For the rifle, however, the stationary barrel appears to have certain advantages, chief among them being perhaps the absence of any complications over bayonet mounting.

However, since certain features of the Garand have been the subject of a good deal of discussion, this opportunity will be taken of presenting the replies made by John C. Garand, inventor of this rifle, to a series of questions asked by the author on his recent visit to Springfield Armory.

First in response to a question concerning the basic decision to employ gas, Mr. Garand stated that gas pressure was best because it did not affect the accuracy of the gun adversely. Further, fluctuations in ammunition have little effect on the operation of the gun.

Then there arose the matter of fouling of the small cylinder in which the piston which drives the operating rod slides. Gas escapes through a small hole near the muzzle of the rifle and impinges upon this piston with force enough to carry out all of the familiar manual operations of bolt unlocking, cartridge ejection, cocking and reloading. No ill effects would follow the carbonizing of the walls of the cylinder (since the piston would keep them clear) were it not for the fact that the barrel and the operating rod being variously exposed to the effects of heat expand at different rates. Thus should the cylinder foul beyond the stroke of the piston while the gun is in action and the barrel subsequently contract, the piston would be jammed. The answer to this problem lay in avoiding a close fit between piston and cylinder. Enough clearance is left to permit the expanding gas to blow the carbon out.

Barrel Resists Erosion

The author's principal interest being in the metallurgy of the various parts of the rifle, Mr. Garand explained his specification of the SAE 4150 chromium-molybdenum steel for the barrel by pointing out that this particular steel resists erosion successfully and corrosion to some extent, although it is a little harder to machine than certain other steels. The molybdenum content helps to maintain the physical properties at elevated temperatures. Barrels made from SAE 1350 steel had only about half the life of the present barrel, a life of 6000 to 7000 rounds as against 10,000 to 15,000 rounds for the new barrel before the accuracy is seriously impaired.

The first indications of a worn barrel are the tumbling of the bullet in flight, causing it to penetrate the target other than point first. This is referred to as "keyholing." Such a condition may occur, of course, when the gun is hot, whereas the same gun would not keyhole when cool. Another indication of approach to the worn-out stage is an increase in flash at the muzzle. As barrel wear increases, so also

More Information on Modern Shell Production

STEEL's first reprint handbook on "Modern Shell Production" detailed the methods and equipment necessary for the most efficient production of high-explosive shell—that is, the shell body which undergoes fragmentation as it reaches its objective. Over 1000 copies of this 76-page book have now been distributed and a limited supply is still available at $1.00 per copy.

Now, a second handbook has been compiled. It goes into further detail on the manufacture of shell, as well as brass cartridge cases, small arms ammunition, shell and bomb fuzes, the flight of the projectile and the airplane bomb. This second handbook is attractively bound, fully-illustrated and entitled "More Information on Modern Shell Production." Orders should be addressed to STEEL, Readers Service Department, Penton building, Cleveland. Price, 50 cents per copy.

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U. S. NAVY PHOTO

AN ATTACK OF CORROSION IS THWARTED!

Most persons do not think of zinc in connection with marine equipment, and yet the United States Navy, as well as independent ship operators, rely on zinc plates to retard the costly corrosion of hulls, boilers and condensers—on vessels which are, today, vital to National Defense.

Because of its relative position in the electrochemical series, zinc in contact with steel in the presence of water will gradually be dissolved, protecting the surrounding area from corrosion. For this reason, it has become common practice to bolt zinc plates directly to the exterior of ships' hulls to provide sacrificial corrosion and save the steel. (Zinc's method of protecting steel by galvanizing involves a similar principle).

The Defense Program requires the employment of all available shipping and the construction of new tonnage in record volume, thereby greatly multiplying the normal needs for hull plates. This use for zinc is typical of the way in which the metal is serving defense without commanding widespread attention.

Actually, the uses of zinc today are no different from those in normal times, but the increased demand on each of the many uses having a part in defense pyramids the load for the zinc industry. Thus it is that manufacturers of non-defense products have not been able to obtain all of the zinc they would like to use. This is part of the price that must be paid for national security.

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Figs. 7, 8 and 9—Turning rifle stocks on a copying machine, trimming by hand, and machine sanding for a fine finish, respectively. OEM photos by Palmer

does the clearance around the bullet. This in turn permits gas leakage and causes loss of pressure with its accompanying slower powder burning rate—and greater flash.

The question as to whether the unoiled surface of the operating parts of a rifle are "slippery" or not is of considerable importance since, under the conditions imposed upon the designer, regular and sufficient lubrication is impossible and reliance must be placed upon successful operation without benefit of any lubricant.

For the firing pin, a chromium-vanadium steel (SAE 6135) of high elastic limit was selected after extensive tests. The piston which drives the operating rod is stainless steel of the cutlery type. It is resistance welded to the forward end of the tube which is part of the operating rod assembly. After being welded, the whole assembly is heat treated. The stainless piston, of course, is rust proof and lasts indefinitely.

Perhaps before proceeding further with this discussion of the design characteristics of the various parts, it might be well to give some indication of how the automatic mechanism works. As the bullet passes the gas port A, Fig. 1, some of the gas blasts into the cylinder B where it strikes the piston and C of the operating rod D with sufficient force to drive the latter rearward against the pressure from spring G.

For the first 5/16-inch rearward movement, the operating lug F merely slides in a straight section of the recess E in the operating rod. The cam surface of this recess E then comes in contact with the operating lug F and cams it up, rotating the bolt counter-clockwise and disengaging the two locking lugs on the bolt from the corresponding recesses in the receiver. Incidentally the helix angle of the bolt and receiver lugs is about 3 degrees, tests having proved that this angle is slight enough to prevent accidental unlocking and sufficient to assist the automatic action of the bolt.

The delay of time lag between initial movement of the operating rod and unlocking of the bolt permits the bullet to leave the muzzle, thus relieving the pressure in the barrel before the bolt is opened. After unlocking, further rotation of the bolt cams the hammer back from the firing pin and withdraws the firing pin from the bolt.

As the operating rod continues its movement to the rear under inertia, it carries the bolt back with it, lug F having reached the end of recess E, Fig. 1. As the bolt slides along the receiver, the cartridge case is withdrawn from the chamber by the extractor. When the mouth of the empty cartridge case clears the breech, the ejector, which exerts a steady pressure on the base of the cartridge, ejects the empty case to the right front through the action of the compressed ejector spring. The rear end of the bolt now forces the hammer back and rides over it, thus compressing the hammer spring. The bolt finally comes to rest near the rear end of the receiver.

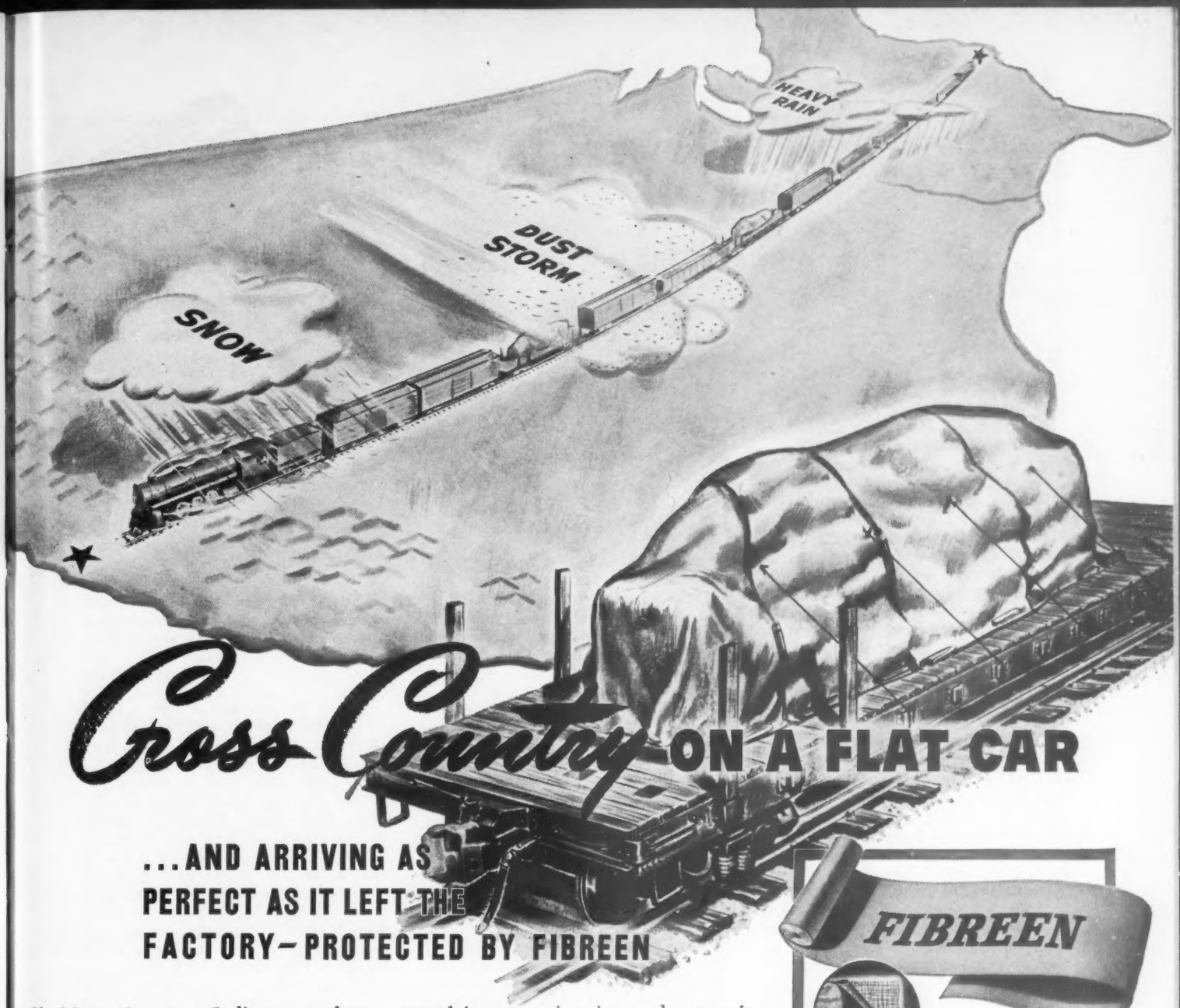
The magazine being now uncovered, the cartridges are forced upward under spring pressure so that the uppermost lies in the path of the bolt. As the latter moves forward its lower front face engages the base of the cartridge case and slides it forward into the chamber. The hammer under pressure from the hammer spring rides on the bottom of the bolt and tends to rise but is caught and held by the trigger lugs which engage the hammer hooks if the pressure on the trigger has been released. If not, the trigger will engage the rear hammer hooks until release of the trigger disengages the sear from the hammer, which then slides into engagement with the trigger lugs.

As the bolt approaches its forward position, the rim of the cartridge is engaged by the extractor and the base of the cartridge forces the ejector into the bolt, thus compressing the ejector spring. The operating lug is now cammed downward by the rear surface of the cam recess in the operating rod, thus rotating the bolt clockwise to engage the locking lugs in the receiver. Thus the bolt is locked. The operating rod continues its forward movement for another 5/16-inch until the rear end of the straight section of the recess in the operating rod contacts the operating lug on the bolt. The cycle is now complete.

Among the many considerations which enter into the design of this fascinating mechanism is the necessity for avoiding any hammering action between the locking lug surfaces and the receiver. These surfaces, of course, are made as hard as metallurgical science can suggest, consistent with the development of other physical qualities such as resistance to shock. But all backlash is eliminated by means of the cartridge ejector, which is assembled into the bolt and is backed by a strong spring. When the bolt locks upon a cartridge, this spring serves to keep the locking lug surfaces in contact, since it is manifestly impossible to secure interchangeability and absence of any tolerances at one and the same time. As a matter of fact, the breaching space is held within 0.002-inch at the plant and is allowed to increase up to 0.008-inch in service.

Another governing consideration in the design of the lock is the necessity, as pointed out by Mr. Garand, for mounting the locking lugs close to the region of application of explosion pressure. If placed too far away, a receiver of any practicable strength would stretch sufficiently to permit an abnormal pull on the cartridge case while the explosion was actually taking place.

(*Please turn to Page* 90)



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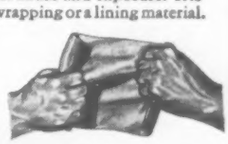

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SERVING INDUSTRY . . . CONSTRUCTION AND AGRICULTURE THROUGHOUT THE WORLD

SWAGING SHELL BANDS

....makes effective attachment method

....lends itself to high production

By R. F. MOYER
Vice President
Standard Machinery Co.
Providence, R. I.

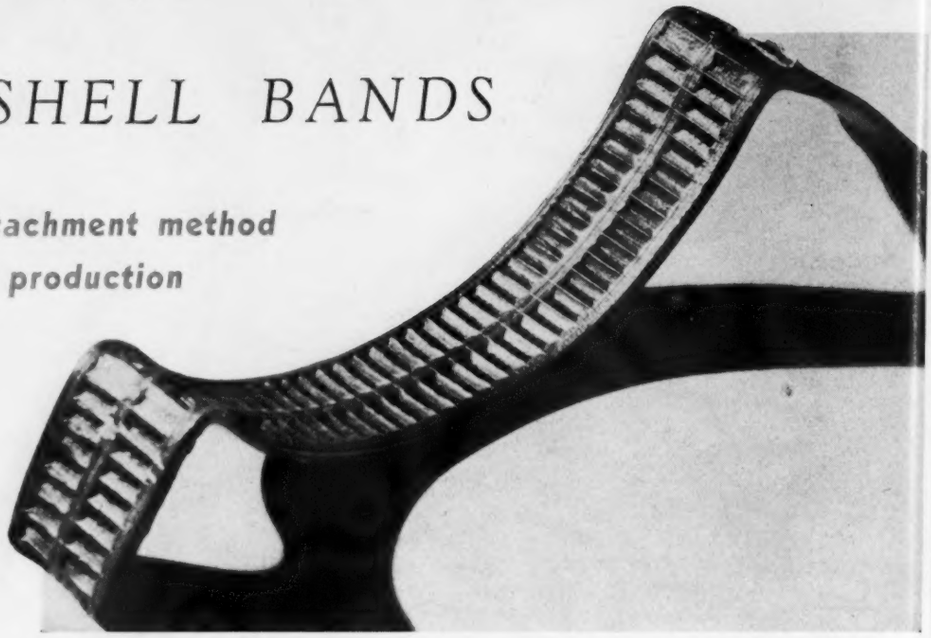


Fig. 1—Closeup of swaged shell band cut and removed from shell to show how the metal has been flowed into every portion of the knurling in base of band groove. Even tool marks from machining are registered. There is no possibility of such a band failing to grip and revolve the shell

■ SINCE some provision must be made to keep a shell nose-first in flight, all guns except some mortars have rifling grooves on the inner surface of the barrel which engage the shell as it is fired from the gun to give it a high rotational speed about its longitudinal axis which enables the shell to reach its objective nose-first. Mortars without rifling grooves fire a shell provided with tail vanes which keep the shell nose-first in flight.

In order that the shell engage the rifling grooves of the barrel, the shell body is provided with a recess near its base which carries a band made of copper or gilding metal. Regardless of the particular analysis of the metal employed, it is a quite soft material so it will easily take the shape of the rifling grooves to spin the shell and at the same time form a gas check or seal to make most effective the action of the propulsion gases in accelerating the shell. This is done by making the finished outside diameter of the band slightly larger than the bore of the gun, thus forcing the excess metal of the band into the rifling grooves as the shell is fired.

There are several methods in use for applying these bands to the recess on the shell body. In many shell plants, the band is applied by a series of radially positioned rams driven by hydraulic cylinders which compress the band on the shell body by a squeezing action.

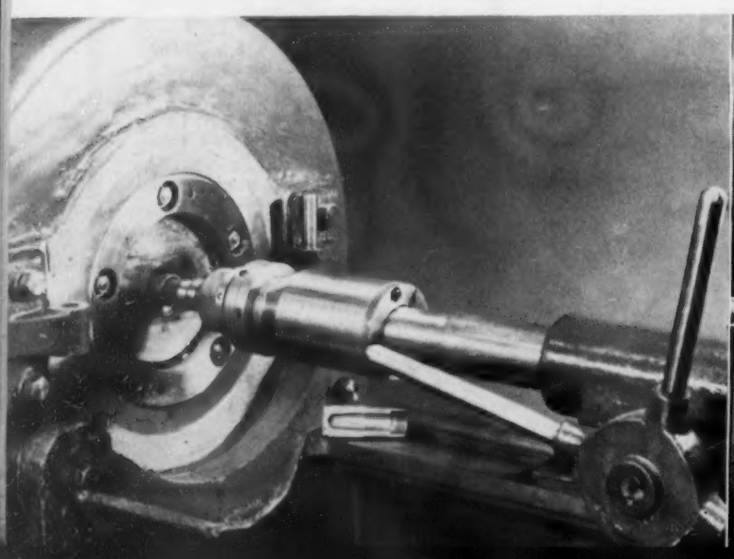
One of the more recent developments is to use rotary swaging to apply the band. Processing by this method depends upon a large number of light blows being rapidly placed upon the band. This action flows the metal of the band completely into the base and undercut sides of the groove in the shell body as well as into the knurling of the groove. This knurling in the base of the band groove is assurance that the spinning action produced by the rifling will spin the shell and not merely the band. After attachment to the shell by this method, bands have been removed and found even to register tool marks present in the bed of the band groove.

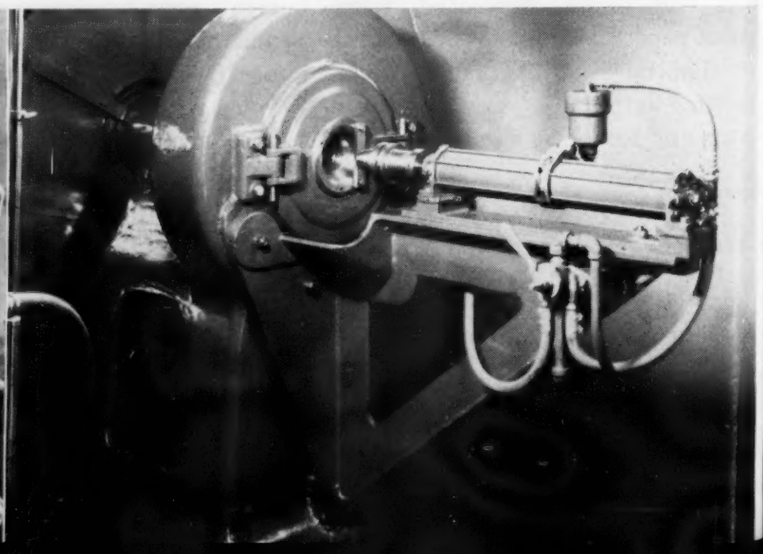
Fig. 1, for example, shows a band which has been swaged onto a shell, then cut and removed. Note how completely the band has conformed to the knurling in the groove of the shell. A close examination of the piece itself shows the metal flowed so completely that every tool mark in the shell groove had been reproduced on the inside of the band.

Swaging the band work hardens it as much as 5 points on the rockwell B scale for gilding metals that normally register a hardness of 40 to 42 points rockwell B. However, swaging does not adversely affect the physical properties of the band from the standpoint of ordnance specifications. Against a requirement of 35,000 pounds tensile strength per square inch, these

Fig. 2—Shell placed on end of mandrel, left below, is advanced into dies by hand driven capstan arrangement here. Door has been removed to show the automatic location of the band over the band groove

Fig. 3—Here, right below, an airdraulic cylinder with hand control valves is used to advance the shell into the dies of the swaging machine





bands register from 38,000 to 43,000 pounds per square inch after swaging. Also the elongation will test between 32 and 39 per cent as compared with the present specifications of 15 per cent elongation.

An advantage of the swaging method is its extreme speed. Using a rotary swaging machine with a feed actuated by an airdraulic cylinder controlled through a foot valve as shown in Fig. 4, the production rate in the case of 37-millimeter shell ranges from 240 to 360 pieces per hour. If a mechanical feed is used instead of the airdraulic, the production will be reduced about 20 per cent.

Actually the banding of this size shell requires less than 2 seconds of machine time so the rate of production with the use of either type feed is dependent upon the facilities provided for getting the shell to and away from the feeding fixture along with the capacity and dexterity of the operator in handling the shell at a uniformly high sustained rate. Operators have been witnessed banding at an average rate of 11 pieces per minute, but of course this speed is too fast to maintain.

Little Maintenance Required

A second important advantage of the swaging method is that the maintenance work involved is limited to the dies and hammers. These items may be reformed numerous times before replacement is required. As the banding material which is being worked is comparatively soft, a large number of shell are banded before refinishing is required.

A third point is that the circumference of the band after attachment may be held within a tolerance of plus or minus 0.004-inch. Thus a finished banding diameter may be established generally about 0.025-inch above the maximum diameter of the finish turned band. This at all times assures sufficient material on the circumference for finish turning and at the same time permits a saving of 25 per cent in amount of machining necessary, depending upon the size and type of band and width of band.

Another feature is that in making the bands it is not necessary to finish them to close tolerances before applying them to the shell as any excess material will simply flow over the edge of the band groove and be removed in the finish turning operation after the band has been applied to the shell.

A further advantage is that since there is a minimum of stock to be removed in the final finishing operation, tool maintenance is held to the lowest possible point. The fact that the outside of the band after attaching by swaging is smooth and free of die marks prevalent in other methods of attachment also reduces tool maintenance. In fact, it is the freedom from these indentations that permits savings of from 15 to 25 per cent in amount of banding material required to fully form the band.

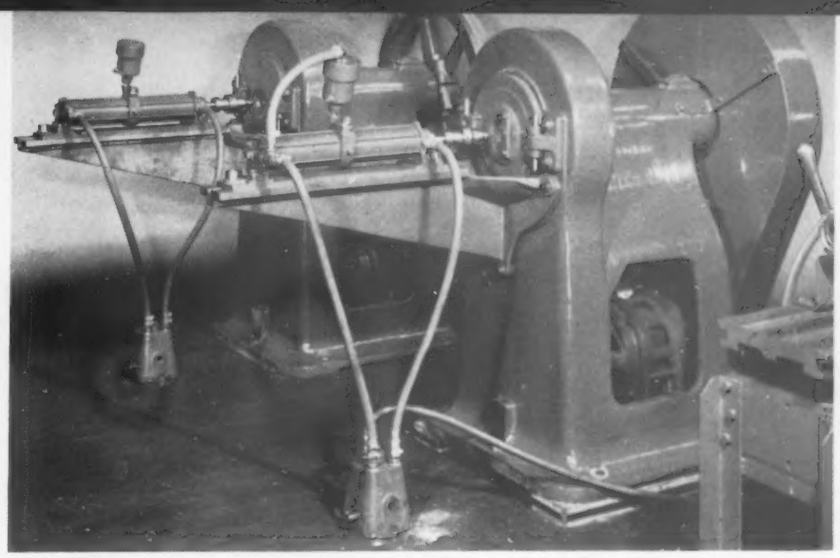


Fig. 4—Most efficient operation is had with the airdraulic feed controlled by foot pedal as shown here. Operation is 25 per cent faster than with hand feed

Modern rotary swaging machines include a number of recent developments which facilitate operation. Possibly most important of these features are the devices for feeding the work. The present feed design is based fundamentally upon fixtures used successfully for other types of rotary swaging for many years.

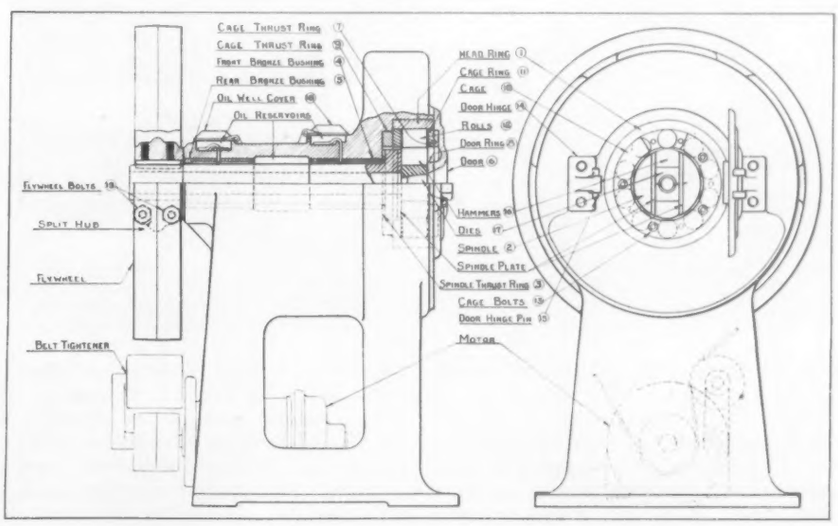
As previously mentioned, the most efficient swaging of shell is done with a feed actuated by an airdraulic cylinder controlled through a foot valve as shown in Fig. 4. However, this same cylinder can be controlled through hand valves as shown in Fig. 3. The airdraulic feed, Figs. 3 and 4, automatically carries the shell into and out of the dies with the single release of the valve by the operator.

Mechanical feed, which is about 20 per cent slower than the automatic airdraulic feed, is operated by means of a capstan wheel as shown in Fig. 2. Approximately a maximum of 10 pounds pressure is required from the operator to carry the band into the dies. A coil spring incorporated into the fixture head enables the operator to spin the capstan wheel in drawing the work from the dies and stripping the shell from the mandrel.

Operating cycle of the rotary swaging process as used here is as follows: If the shell is of the high-explosive type having a powder cavity, the shell body is placed on the end of a mandrel in the fixture as shown in Fig. 2. On the other hand, armor piercer or solid shell are located in a socket in the fixture rather than on the mandrel.

Next the band is loosely fitted over the end of the shell and the shell is advanced into the dies, see Fig. 2. The locating sleeve, operated

Fig. 5—Diagrammatic sketch showing construction of rotary swaging machine made by Standard Machinery Co., Providence, R. I., and suitable for swaging shell bands as described in accompanying text, where operation is explained



automatically in connection with the feeding fixture, holds the band in its proper location over the groove in the shell body. As the swaging is started, the front end of the band is peened in the groove, the sleeve is stopped and prevented from entering the dies.

Approximately 2 seconds are required for banding a 37-millimeter shell. Reversing the action of the feed automatically withdraws the shell from the machine and strips it from the mandrel. Fig. 5 shows section and end view of a rotary swaging machine built by Standard Machinery Co., Providence, R. I. Here the spindle 2 is of forged steel, machined and ground. It is hollow so that the stop rod can pass through. Die slot is lined with hardened steel plates held by large rivets. Spindle bearings 4 and 5 are widely spaced, of heavy bronze type, line reamed in position. Lubrication is by wick feed from large oil reservoirs 18 which feed other working parts, also. Antifriction bearings also are available. The swaging head is lined with headring 1 of special steel, hardened and ground and pressed into place. Holes through rear of head allow ring to be removed.

Alloy steel rolls 12 are hardened and ground accurately to size. Roll cage 10 is a steel forging machined all over. Cap cage 11 is dowelled and fastened by cake bolts 13. Roll slots are accurately spaced. Cage and rolls creep slowly around headring to distribute wear evenly and to reduce shock between hammers and rolls. Cage thrust rings 7 and 9 take front and rear thrust of cage. Door 6 is securely held by two taper pins 15 which compensate for wear. One pin, acting as hinge, permits door to be swung open to expose dies, hammers, cage and rolls. Door ring 8 is hardened and ground steel, placed to take forward thrust of dies.

Dies 17 are constructed so they may be changed quickly and removed easily for inspection or cleaning.

The rotary swaging machine shown in Fig. 3 is of the type used in the banding of all types of shell from 20 to 155-millimeter. In those types of United States Navy and British shell having undercut band grooves, a double tapered die arrangement fully fills all voids with the banding material. Provision is made for adapting or readily interchanging the parts of the swager for handling various size shell in the same equipment. The swager can be changed over to handle any size shell in its range in less than 10 minutes since only three different parts of the machine need be changed to handle a different shell size.

Power requirements are not large. For instance, a rotary swaging machine suitable for banding shell in all sizes from 1.1-inch to 47-millimeter requires only a 7½-horsepower motor and about 40 pounds of air pressure for the feed.

Action of the rotary swaging machine is as follows: The basis of operation is the multiplicity of light blows rapidly applied through formed dies upon the blank. This is accompanied by use of a spindle having a flywheel on the drive end, the other end being slotted with a sufficient width to accommodate the dies. These machines are driven by a 4 to 1 reduction from a motor which revolves at 1800 revolutions per minute. Thus the spindle speed is 450 revolutions per minute.

The hammers have a flat contact with the back of the dies and are arced on the opposite side so as to form a line contact in their passing of the rollers. The rollers are spaced opposite to each other as shown in the diagram, Fig. 5, so they develop pressure simultaneously in their action upon the work. As soon as the hammers leave the rollers, centrifugal force carries the hammer with its dies counterpart away from the work.

Operate at High Speeds

There are ten rolls in the cage so the spindle rotating at 450 revolutions per minute delivers close to 4500 impact blows per minute on the band. Refinements now permit these machines to operate continuously at high speeds.

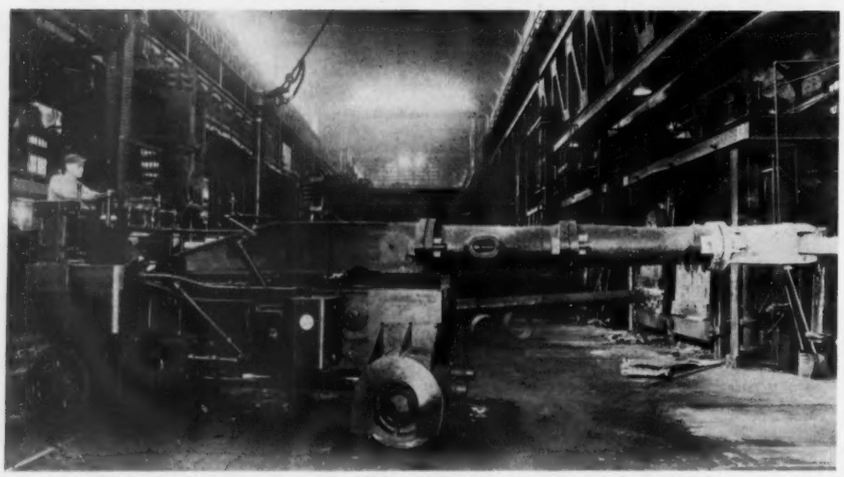
Modern die design has increased the scope of operations that can be handled through swaging. Highly efficient feeding fixtures also are responsible for an increase in the types of work that now can be performed economically on such equipment.

Fig. 2 is a closeup showing the Standard Machinery Co.'s patented feeding head having a shell and band started into the dies. The door has been removed here to show the automatic location of the band over the band groove in the shell body. As the dies are rotated, they are pushing back the band until it comes in contact with the bushing, holding it in proper position over the knurled band groove. As soon as the front end of the band is swaged into the band groove, the bushing is withheld, and the shell and band are continued through the dies.

Fig. 3 shows the same type of machine, but here the door is in position, and an airdraulic cylinder is being used to carry the work through the dies instead of the capstan hand-powered mechanical feed used in Fig. 2. With the airdraulic feed in Fig. 3, tripping the valve starts the cycle which puts the shell through the dies and automatically returns it at three times the entry speed. This particular unit accommodates shell sizes from 1.1-inch navy type to the 2-pounder and 47-millimeter shell.

Patent applications cover the automatic features, especially in relation to methods of projecting the work into and out of the dies, automatically locating the band at the proper point in the groove and stripping the mandrel from the banded shell.

"Easy" on the Operator



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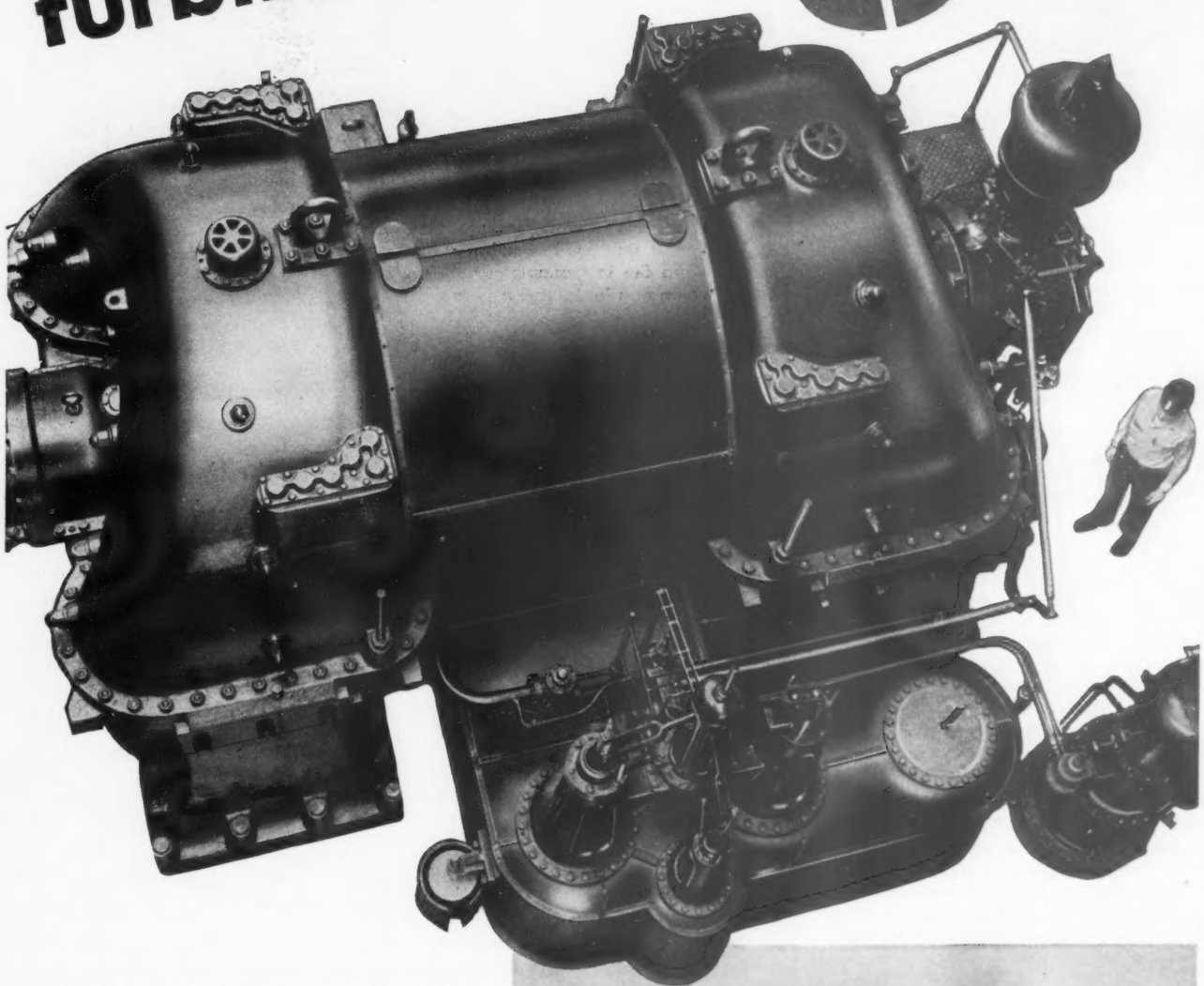

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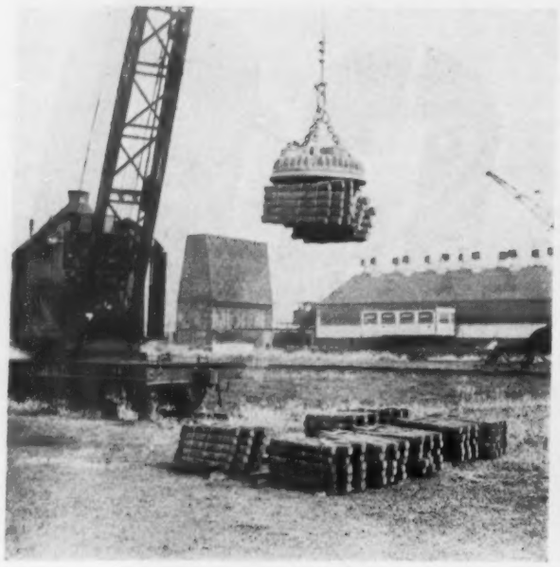


Fig. 1. (Left)—Heavy rough forgings wire strapped into bundles of 25 are easily picked up as a unit with a magnet crane. Fig. 2. (Right)—The crane quickly places the bundles in gondola cars. Thus handling is one simple operation from storage pile to freight car. Unloading is equally as simple

Wire Strapping Speeds

MATERIALS HANDLING **and** *SHIPMENTS*

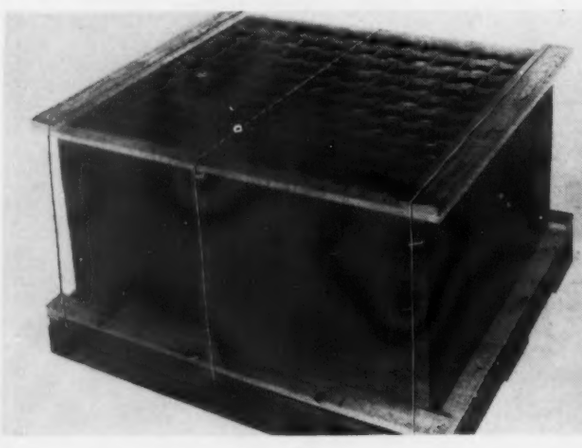
■ WITH the national emergency focusing attention on greater production, efficient materials handling methods are most vital since modern materials handling simplifies production, automatically increasing production thereby. Furthermore, efficient flow of materials lowers production costs.

One of the rapidly expanding handling developments is the use of wire to strap products in groups on pallets or skids to facilitate handling during storage and shipment. This method of shipping is constantly increasing in volume due to the large shipping and handling economies it has effected. A large factor in the development of skid or pallet shipping is the use of round steel binders. Round wire strapping machines and round wire strapping have helped make this method of shipping economically possible. It helps both shippers and consignees, not alone in container costs but in the costs of handling.

It is readily understood that loading or unloading costs are greatly reduced when materials or products are shipped on pallets or skids since the items are then handled in

By ADOLPH LARSEN
Vice President
The Gerrard Co. Inc.
2915 West Forty-Seventh Street
Chicago

Fig. 3. (Left)—Porcelain enameled sheet steel parts are shipped easily and with no danger of chipping in transit when packed in individual pockets of a cardboard carton as shown here. Wire strapping to a double-faced pallet facilitates shipping as well as handling in and out of storage. Fig. 4. (Right)—This shows how the cartons in Fig. 3 can be packed into a box car to utilize space efficiently —and the loading is fast and simple when done with a fork truck



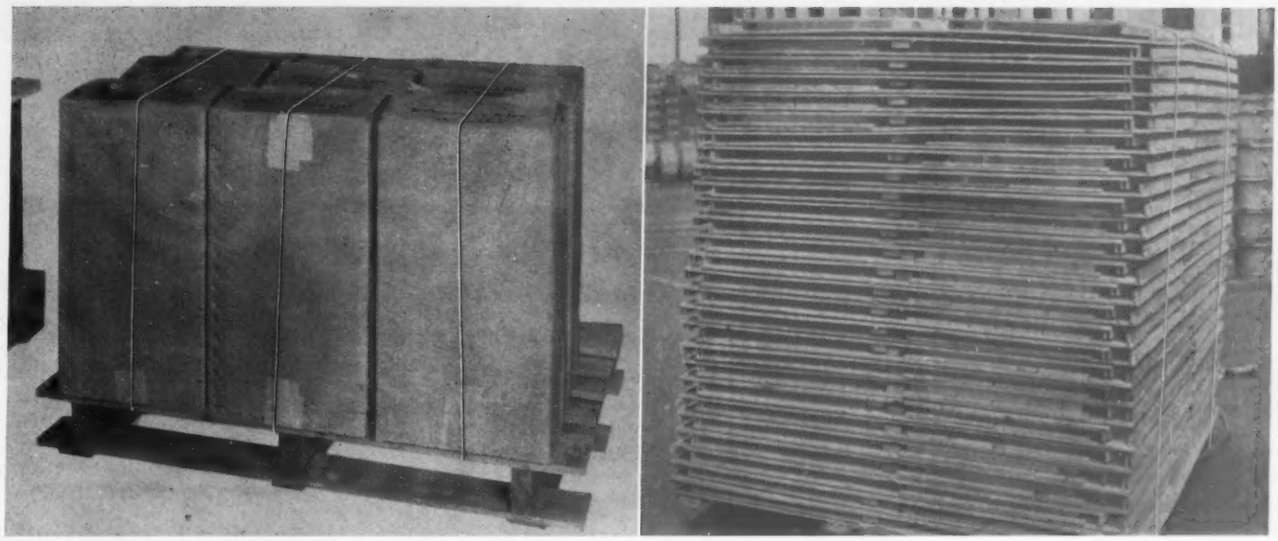


Fig. 5. (Left)—Completed products such as porcelain enameled ware are shipped, handled in and out of storage more efficiently when wire strapped to a double-faced skeleton type pallet as shown here. Nine items, each in its individual carton are handled as a single unit. Fig. 6. (Right)—Pallets and skids as well as knocked down crates (shown here) are also handled and shipped efficiently when bundled into a single package or load

compact groups instead of individually. A few examples will show typical savings that are being effected.

For instance, coated paper on skids was formerly packed in eight individual wooden boxes at a cost of $2 per box; total cost, $16. In the newest application of round wire strapping to such a shipment, the packing routine proceeds as follows: The paper, wrapped with a heavy kraft covering, is placed on a wooden skid or platform. A wooden cover is placed on top the paper load. Then special galvanized high-tensile round wire is applied to strap the load firmly to the skid. The cost of the skid, cover and round wire strapping amount to approximately $4.30, a total saving of $11.70 for each skid package.

To handle this loaded skid or platform, a lift truck is used. This same method is also employed to unload the skid shipment to produce an additional saving in the shorter time required to unload the freight car.

Rough forged blanks for crankshafts, formerly shipped loose, are tied now in bundles of 25. These are reinforced with 8-gage high-tensile round wire strapping. See Figs. 1 and 2. In this case the loading, unloading and handling costs are reduced approximately 60 per cent. An additional advantage is noticeably apparent; wire bundling the work on individual pallets or units makes inventory control and count simplicity itself.

Skid tying of automobile springs produces a savings of better than 50 per cent in handling costs. Wire-bound boxes, formerly shipped loose in carloads, were loaded and unloaded individually. Today, these springs are bundled on a unit pallet and tied with round high-tensile wire strapping at a saving in handling costs of $14 per car.

One of the largest electrical manufacturers is today shipping most of its small individual products by way of the pallet method and is making a substantial saving in handling costs. Illustration Fig. 3 shows porcelain products for the electrical field shipped on double-faced pallets and tied by the round wire strapping method. Fig. 4 shows how these skids are placed in a freight car. They are now ready for wire strapping the group to form carload stowage. It is an easy matter to load a box car with these units, strapping them against walls and floor of car to prevent shifting in transit.

Fire brick which previously went to destination in wooden boxes—for export—now is moved and shipped on wooden skids. This improvement in shipping saved the firebrick manufacturer approximately 53 per cent in shipping and handling costs.

Shipping unit packages wire strapped on pallets or skid also has greatly reduced damage claims to merchandise in transit. One method found highly advantageous is to wire strap porcelain enameled articles packed in individual cartons as shown in Fig. 5. Here nine cartons are strapped to a double faced skeleton-type pallet using three wire ties. Thus these are handled, shipped and stored as one unit instead of nine.

Of course practically all of these skids and pallets can be reused many times. It is an easy and inexpensive job to knock them down and strap them into convenient unit packages for return to original point of use. Similarly knocked down crates and cartons are readily wire strapped onto a skid for shipment as a single compact unit. See Fig. 6.

New Tracing Cloth Gives Ink-Like Results

■ Clear ink-like prints may be made from pencil tracings with the use of a new white tracing cloth recently announced by Frederick Post Co., Box 803, Chicago. Known as No. 123 Whitex, the cloth is tough, durable and will not discolor with age. Its glossy "stay clean" back is an added feature, and its extra transparency adds speed to print production.

The development erases quickly and cleanly with art gum or a soft eraser, and erasures do not show on the blueprint. It also takes colored pencils sharply and cleanly.

Battelle Lists Books

■ More than 500 Battelle-written books, patents, and journal contributions are listed in a booklet issued by Battelle Memorial Institute at Columbus, O., one of the country's largest industrial research organizations.

Since its beginning, Battelle has utilized the medium of the various technical and scientific journals in disseminating the results of its research in chemistry, ceramics, fuels and metallurgy. Compiled by Thelma R. Reinberg, institute librarian, the booklet lists all contributions to the technological literature made by Battelle staff members during the 11-year history of the institute. Copies of the booklet are available upon request.

Bases for MACHINE TOOLS And POWER UNITS Tailored To Fit By Welding

By WALTER J. BROOKING
Testing and Research Department
R. G. LeTourneau Inc.
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■ ONE OF the most important factors of the "first cost" of a machine tool or a power unit is the cost of adapting that unit to its job in such a way as to make it do that job most efficiently. Those "installation" costs are often somewhat indeterminately accounted for, and are frequently absorbed into "miscellaneous expenses" or "overhead" and thus to a certain degree obscured, but actually they form a very real part of the first cost of a new machine and should be carefully held to a minimum and added to the purchase price of the unit.

Power units such as gasoline or diesel engines usually have brackets and bolt holes on their frames which are designed to fasten the unit to some sort of a framework which will mount the power unit in such a way as to apply the power where it is wanted. The real base, or framework on which the motor is placed depends upon the actual function of the machine and other such factors as space, location, appearance and special fixtures which may be attached to it.

Such bases may be constructed by casting them from iron or steel; bolting or riveting steel plates or structural members together; or fabricating them from steel structural shapes and plates by arc welding. The last method is rapidly superseding older methods because of its economies in time, labor and materials and because of the great freedom of design which it affords in adjusting the unit to fit space limits or mechanical relationships while maintaining great rigidity and freedom from effects of vibration.

Note the simplicity and effectiveness of the arc-welded engine base illustrated in Fig. 1. Here a battery of diesel engines drives electric generators in a factory power plant. These bases are completely built up as box sections from commercial rolled steel plates and shapes. Two main box sections whose side plates were sheared from strip stock and whose top and bottom plates were sheared and bent to shape were made large enough to mount both motor and generator. The upright and cross member box sections were made by welding two pieces of standard angles together into box sections. Caps of plate were sheared or flame cut to size and welded to ends of the box sections. The main bed frames and smaller box sections then were set up, tack welded together, the reinforcement tacked on, and with a few short welds the whole resulting structure was solidly fused into one rigid unit.

The only machining necessary to complete the base was to drill the mounting-bolt holes and tap a few holes for cap screws instead of regular bolts. After a good cleaning the base was painted, the main base side boxes were filled with concrete to add weight, and the finished base was ready for assembly and installation.

One of the biggest advantages in this method is that any of a great variety of steel shapes could have been used. Any form of rolled or built-up section which would withstand the stresses applied to the frame could be used. The actual material employed should depend upon the most available and economical shapes at hand. Usually it can be taken from either the regular steel stock around a factory,

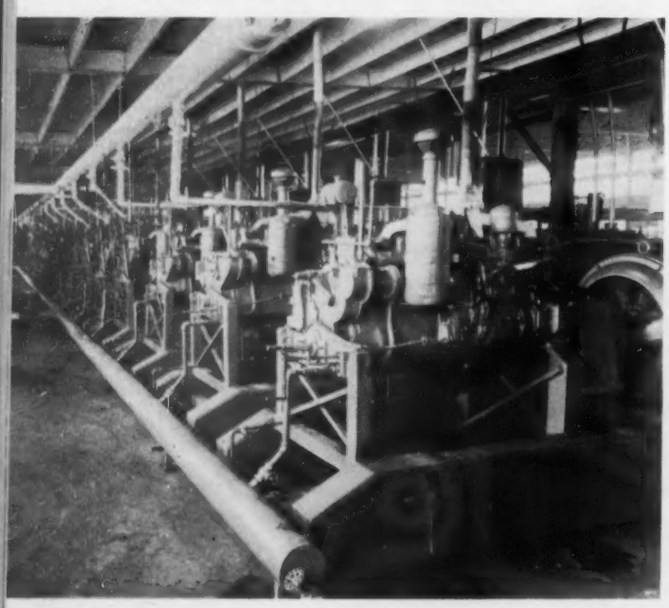
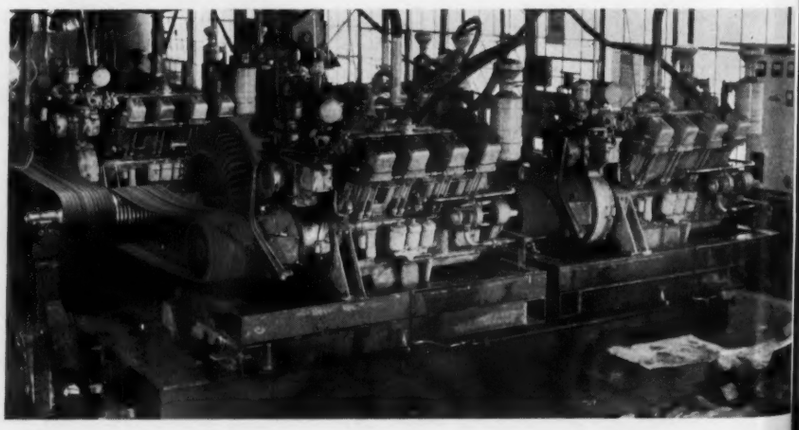


Fig. 1—The arc-welded bases for these motors and generators, left, illustrate simplicity of design and effective use of material

Fig. 2—This arc welded steel base, right below, anchors four 190-horsepower diesel engines which drive a single electric generator. Base is fabricated rolled steel plates and shapes filled with concrete. Main bed is 16 x 20 feet by 16 inches high



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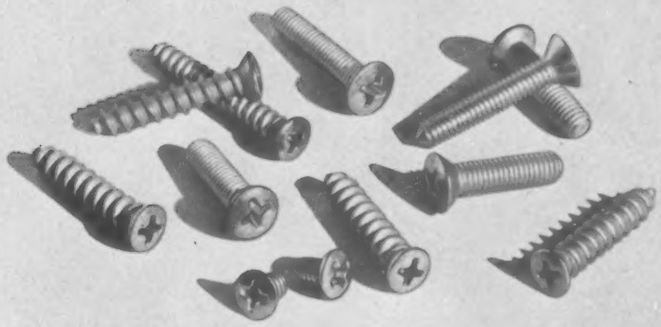

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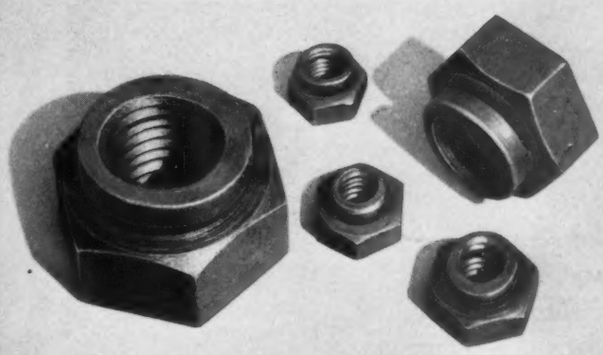

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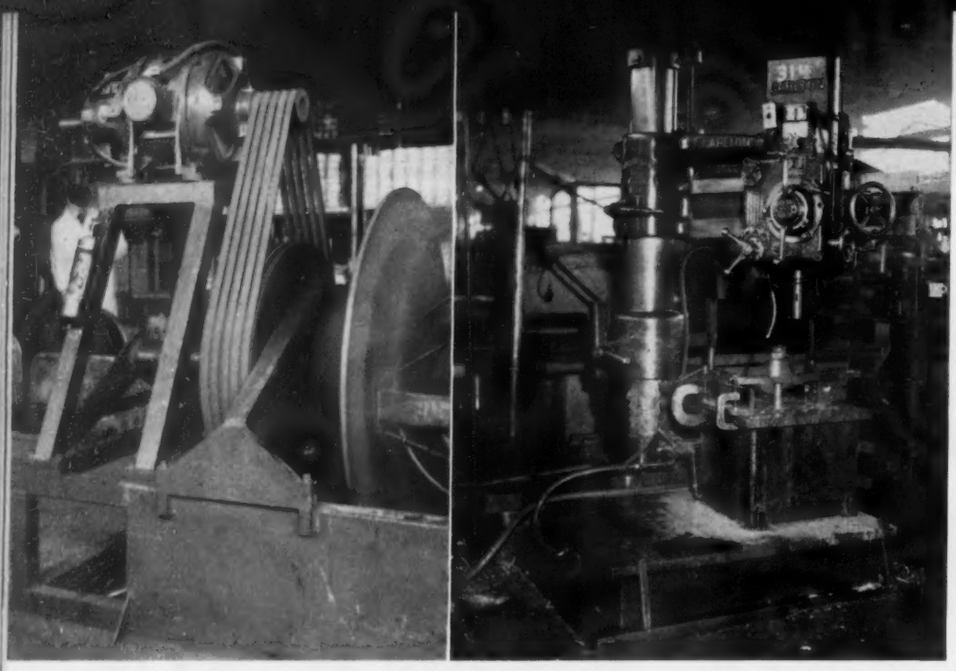

Fig. 3—This easily constructed, removable all-welded bracket, left above, provides a simple and economical motor mount

Fig. 4—The arc welded steel base under this radial drill, right above, is rigid and heavy enough to assure accuracy of machining and freedom from vibration, as well as allowing room for the operator or a helper to make or remove setups on one end of the base while the drill is working on the other

or even from the scrap pile. The base shown in Fig. 1 could easily have been made from large I-beams, T-irons, H-beams, channels, or any combination of them for the main side frames. The same is true of the cross members, uprights and reinforcement bars.

Such a base can be made in a few hours and exactly to fit the space and other dimensional requirements simply by making a layout of the required points of function—bolt holes, length, width, bearing points, etc.—and sketching in the members which distribute the material required to meet the needs for strength and bearing surface. The sketch can then be given to any good shop mechanic who understands the use of an oxy-acetylene torch, the shop's other metal cutting and shaping tools, and an arc welding machine; and in a short period of time he will have fabricated the unit from steel in much the same way that a carpenter would make a similar structure from wood.

Such arc welded bases have few limitations of size, as is illustrated by Fig. 2, showing four 190-horsepower diesel engines combined power of which operates one generator, all mounted on one large base. This large base was made by first building up a box structure of steel plates 16 feet wide by 20 feet long and 16 inches high with a sufficiently large square hole in the center to allow the generator to be mounted with a part of the cage below the top of the rest of the base. Holes were left in the top plate between the internal web plates, and after the box structure was in place, it was poured full of concrete to give weight to the structure. Separate bases for the different engines and the generator were built up using box sections made from standard angles, and building them up like cribbing, as shown.

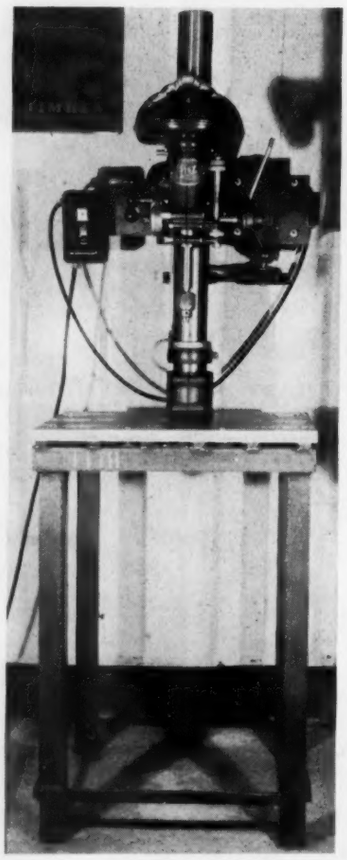

Fig. 5—The ease with which this welded steel base can be kept clean, and the effectiveness with which a large variety of specimen holding devices and odd pieces can be fastened to the table make this small drill of great value in the metallurgical laboratory

The two bearing blocks at the extreme ends of the generator drive shaft were made by welding box sections of angles upright to the main base, welding reinforcement bars to the upright beam and welding on its top a cap with bolt holes already drilled in it. The boring seat and cap then were fabricated from plate and a short piece of box section, carefully machined and bolted to the upright box beam. The main bearing assemblies were a part of the generator, and were simply bolted to bearing foot blocks cut from heavy bar stock which had been drilled and then welded to the main base structure.

Low-Cost Method

It would be difficult to achieve the rigidity and strength in such a base with any other method of construction and probably impossible to do so with the same low cost for material and labor, designing and installation.

Electric motors, because of their relatively small size and symmetrical form, are often mounted on a small bracket in some restricted space on the machine for which they serve as the power unit. Fig. 3 illustrates an electric motor mounting bracket somewhat more complicated than usual. The design of the machine which this 20-horsepower motor drives required that the motor be placed above the 3-foot main drive pulley, so the simplest design possible was to place the motor bed frame on four supporting members whose footing attached to the main frame of the machine.

The four supporting members were made of ordinary steel angles arc welded together into box beams. The motor base to which the motor actually is bolted was made of four short lengths of similar box beams made from angles, all welded into a rectangular frame, with small square plates welded into the ends of the box beams to close them. Holes were drilled through the box sections at each corner to receive the bolts from the motor itself. Four sets of foot-blocks were then cut from bar stock, all were drilled in each end so as to allow the support beams to set between the two bolt holes and allow clearance for bolt heads, the bottom block on each set tapped for cap-screws, and the motor bracket was ready to be set up and welded.

The foot blocks first were set in position on the main machine base and tacked in position. The four supporting beams were set on them

(*Please turn to Page* 88)

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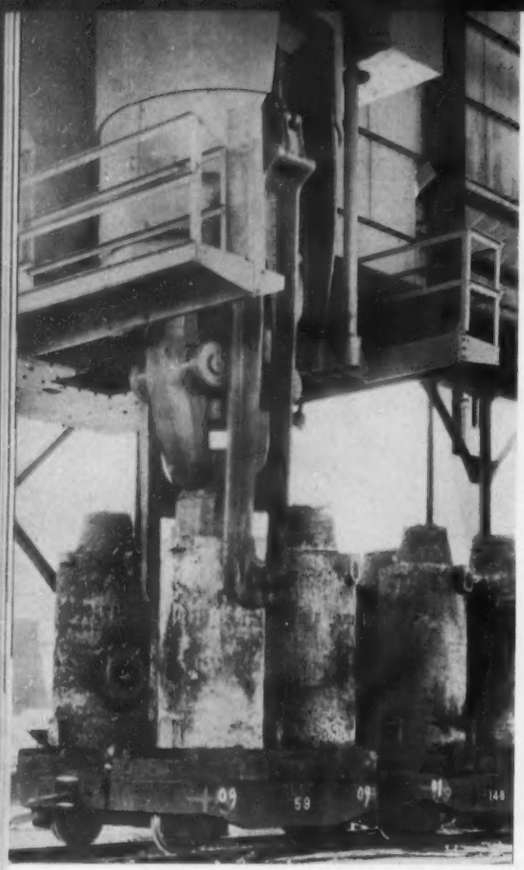


Fig. 1—Ingot stripper showing links engaged with mold trunnions and an ingot in the jaws of the bullnose

Design and Operation of

INGOT STRIPPERS

Use of big-end-up ingots brought development of auxiliary stripping mechanism. Author presents details of construction of modern stripper of the combination type for handling various kinds of steel plant molds

By H. W. BALL
Assistant Chief Engineer
Morgan Engineering Co.
Alliance, O.

■ Requirements of the steel industry in the making of steel have advanced so rapidly that it has made it necessary for designers and builders of ingot stripping cranes to change this type of crane more rapidly than any other type.

The original ingot stripping mechanism was of the hydraulically operated type. About 1899, the well-known conventional screw type stripping crane was developed. Its stripping motion is accomplished by two bronze nuts with right and left hand threads, operating on an alloy steel screw. The upper end of the screw shaft is square and passes through a bronze bushed sleeve. Revolving motion is given to this shaft by means of the motor acting through a train of gears.

The upper bronze nut is held at the top of the stripper barrel; the lower bronze nut is held in the stripping ram, and the action of these nuts driven by means of the screw produces twice the travel of the ram as of the screw. The ram is free to move vertically in the stripper barrel and engage the top of the ingot with what is known as a bullnose. This so-called bullnose is attached to the bottom of the ram with a tight fitting key. The bottom of the nose engages the top of the ingot, thus pushing the ingot out of the mold.

The screw shaft with right and left hand threads is extended on the upper end performing as a guide, its length being determined by the amount of vertical lift required. It is protected by a steel tube housing which prevents any foreign matter from entering the stripper barrel which is a one-piece casting filled with oil for lubricating the screw and bronze nuts. In filling the barrel with the lubricant the nuts should always be drawn together so that the proper quantity may be obtained.

The hoist motion of this type of crane as originally built was operated through a rack and pinion, and in later years was changed to operate by means of steel cables acting over sheaves and drums.

The trolley frame for this type of crane is a one-piece, open-box section steel casting or welded construction, supported on four rolled steel wheels. A rolled steel shell is suspended from the trolley which contains cast steel guides for vertically guiding the stripping mechanism.

The stripping mechanism is hoisted by means of four parts of wire rope which wind over four separate cast steel drums and work in series, two of which do the hoisting with tongs open and two with tongs closed. The tongs open and close automatically according to the pull of the opening or closing ropes. The four drums work in pairs by a ratchet clutch operated by a hand lever in the cage. This ratchet clutch is so arranged that it will drive one pair of drums at a time, thus hoisting with the tongs either open or closed at will of operator.

The stripping mechanism is nearly counterbalanced by a counterweight, guided on the side of the shell and suspended from four wire ropes which wind on the four drums. The hoist motor has little more than the actual weight of the ingot and mold to lift, friction being reduced to a minimum.

An Inspection of this drawing, Fig. 6, discloses that all the strains due to stripping of the ingot are simply transmitted from links A through barrel B down through nut C to screw D and nut E then to plunger F; therefore, they do not in any manner pass through the ropes supporting the stripping mechanism or through any part of the trolley proper. The ropes simply lift the stripping mechanism and take the weight off ingot and mold.

The stripping mechanism is made so that the bullnose can be withdrawn from a soft ingot by simply reversing the motor and at this operation the mold will be lifted up against part G, thus freeing the ingot from the bullnose. The lower parts of the links are engaged when stripping a long ingot and the cross-pieces, marked G, when stripping butts.

The stripping links are operated by motor-driven bell crank levers, N and P, to which the link operating ropes are attached. These ropes lead from levers N and P to sheaves J, which are attached to levers L, and through links, M, to the stripping links, A. Thus, the up-and-down movement of the levers, N and P, cause the stripping links to open and close to any desired position in its range.

The hoisting cables lead from the hoist drum to sheaves, K, back up to equalizer R.

In correct operation, the ingot is not lifted from the car. The links are lowered over the mold, links closed to engage the mold ears, then the entire mechanism is hoisted, which operation will lift the mold from the ingot, provided the same is not a sticker, an expression used to indicate ingots that are difficult to remove. Should the ingot prove to be a sticker the mold and ingot should be lowered to the car and the stripping mechanism started. As soon as the stripping ram comes in contact with the ingot, the stripping unit with links and mold will be automatically lifted by the screw, thus freeing the mold from the ingot, the counterweight automatically taking up all slack in the cables. As soon as the mold is free from the ingot the stripping mechanism should be stopped and the

rope hoist used for further lifting of the mold.

Some operators form the habit of lifting the mold and ingot off, then if the ingot does not free itself they start the stripping ram and push the ingot out, which if raised high would drop the ingot to the car. This is strictly up to the operator, as there is positively no necessity for dropping ingots on the cars.

Some ingot stripping cranes are designed and built with the use of cables instead of the screw for stripping, and in connection with these cables a screw is used for adjusting the bullnose for different heights of ingots.

Due to the fact that steel plants are now casting many big-end-up ingots having hot tops, it was necessary for the crane manufacturer to develop an auxiliary stripping mechanism that could be adapted to the old type strippers which had been stripping big-end-down ingots.

This mechanism is attached to the present ingot stripper by having supporting lugs cast on the side of the frame engaging the links which were formerly used for holding down the molds on the cars. The pull tongs operating ram is attached to the ram of the present stripper by removing the bullnose, using the same key for attaching the auxiliary stripping unit as was used for securing the bullnose. This auxiliary equipment also has links for holding down the molds. These links are provided with paddle type ends for guiding them on the molds.

The range of capacity for ingot stripping cranes is 100, 150, and 200 tons. For the past few years steel plant requirements have been mainly for 200-ton ingot stripping cranes. Many of the late machines have been of the combination type which includes four distinct methods of operation: To strip molds from flush top small-end-up or standard ingots, as shown in Fig. 2; to pull hot top or big-end-up ingots from the mold, as shown in Fig. 3; for stripping flush type big-end-up ingots with the aid of stripping stool, as shown in Fig. 4; to loosen small-end-up or standard ingots from stools after molds have been removed, as shown in Fig. 5.

On this combination type of crane the hoist has a single drum with the ropes leading from the drum over sheaves attached to levers connected to the links, then to levers on the trolley which are actuated by the link operating motor.

The levers and ropes are arranged in pairs, and the mechanism is so constructed that when two of these sheaves are raised, the other two are lowered. Thus, by lowering the two inside sheaves and ropes and raising the outside sheaves and ropes, the links will be opened. The opposite action will close links. Limit switch is provided to limit travel in both directions.

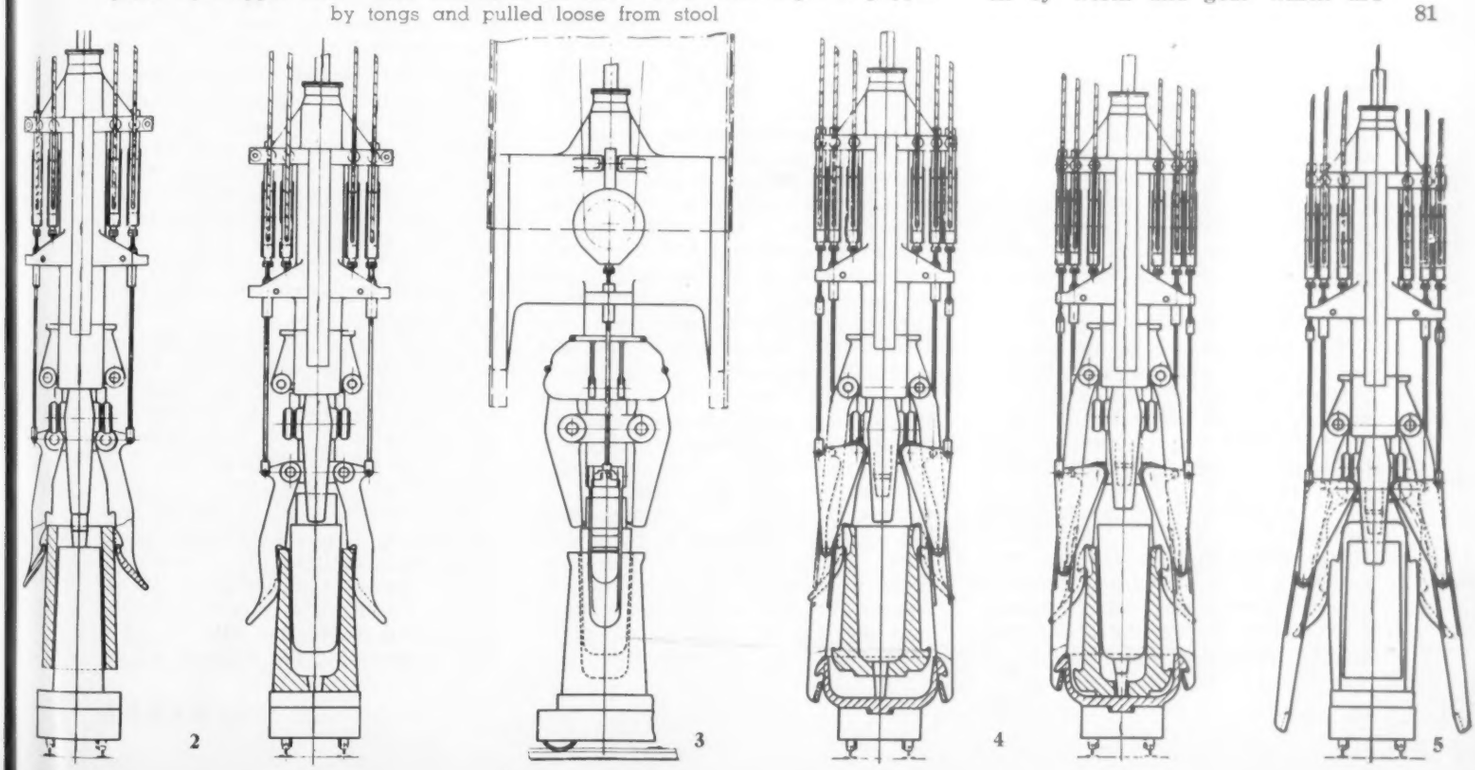
In addition to the regular links, provision is made for a pair of long links for engaging the long lugs on the stripping stool when stripping flush-type, big-end-up ingots. These links are separate and operate independently from the regular links.

In addition to the links, provision is made for a set of automatic tongs for gripping the hot top of big-end-up ingots, to be suspended from the lower end of the stripper barrel and usually at right angles to the mold links.

The tongs consist of two cast steel levers trunnioned near the center and provided with rollers. The latter work in slots which are inclined toward each other in the form of an inverted "V" in the tongs frame supported on the stripper barrel. These tongs hang in the open position and are thus closed by the action of the rollers in the inclined slots.

The stripping mechanism is a separate unit and so arranged that the entire unit may be lowered to the floor by the hoisting mechanism to facilitate inspection and changes. The bullnose has an extra travel distance which permits the removal of short ingots. The hoist is provided with a limit stop and also with a ratchet gear to prevent unwinding of ropes should the mechanism be suddenly stopped while being lowered. The driving units for the hoisting, stripping, and link operating motions are usually driven by worm and gear which are

Fig. 2—Stripper arranged for stripping small-end-up or standard ingots. Bullnose holds ingot on car while links engage mold lugs and lift mold from its stool. Fig. 3—Stripper arranged for big-end-up ingots. Bits provided on links are designed to hold mold on car while tongs grip ingot and withdraw it from mold. Fig. 4—Stripper arranged for stripping big-end-up, flush-top ingots when mold basket is used. Bits provided on short links are designed to push down on top of mold. Additional long links pull up against ears on basket, forcing center pin through bottom of mold and raising ingot above top of mold. Gripping tongs then are used for withdrawing ingot from mold. Fig. 5—Stripper arranged for loosening small-end-up or standard ingots from stools after molds have been removed. This is accomplished by providing a horseshoe-shaped unit held in place by stripper links. This unit holds the stool down while ingot is gripped by tongs and pulled loose from stool



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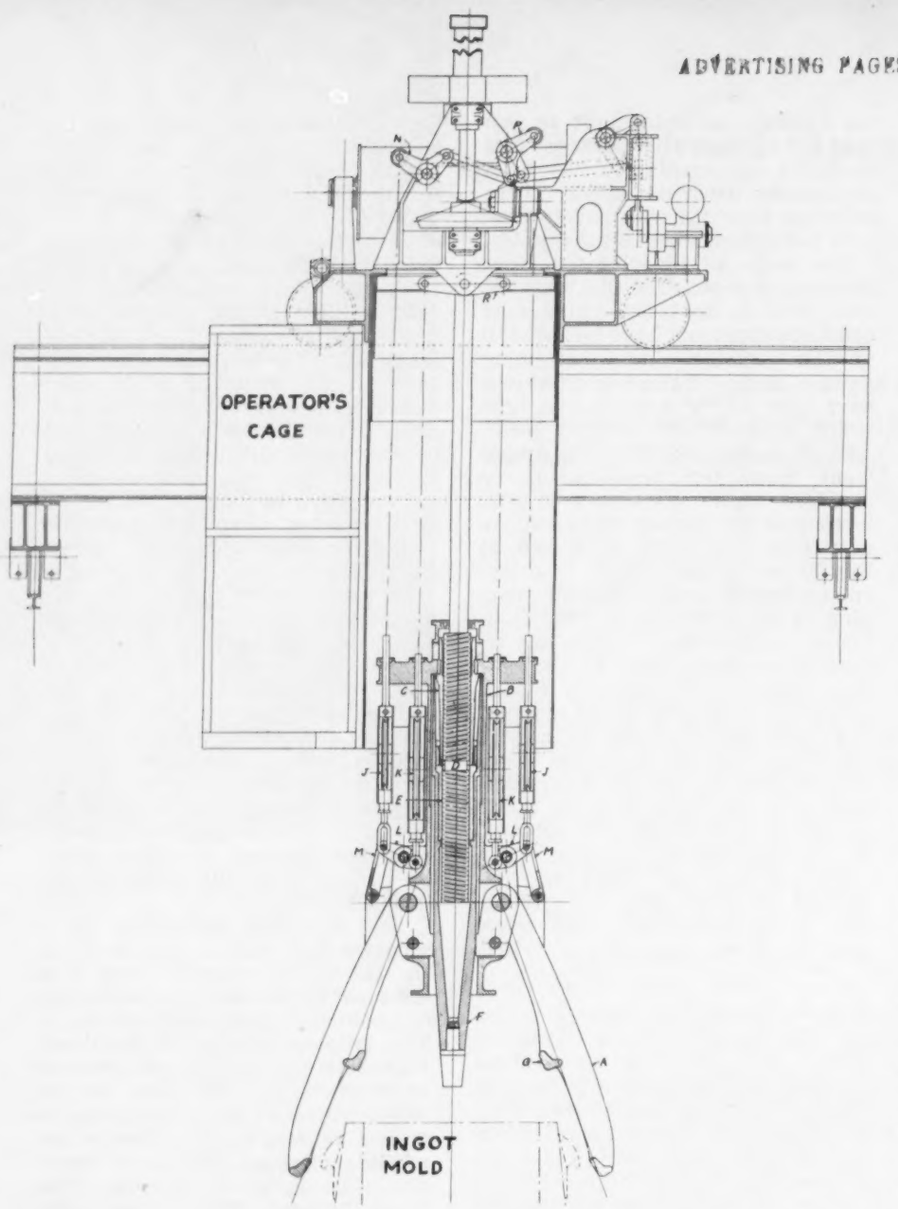


Fig. 6—Cross section of trolley showing screw-type stripping mechanism.

enclosed in steel housings, and well lubricated with either gear-driven or motor-driven oil pumps. The trolley travel and bridge travel motions are of the spur gear type with the gears enclosed in oil-tight cases.

The bearings used throughout this type of crane are usually of the antifriction type and some of the steel plants require them to be lubricated with a centralized system having one unit located on the trolley, the second unit on the moving parts of the stripping mechanism, and the third unit mounted on one end of the bridge.

The operator's cage of all-steel and fireproof construction is located beneath the trolley along side the guide shell; it is of the enclosed type provided with heater and ventilating fan. An indicator is provided near the operator to indicate the position of the bullnose or tongs.

The bridge construction for these cranes is of box section consisting of two web plates joined to top and bottom cover plates by four angles; usually of the 8-wheel construction, having four wheels on each end of the bridge mounted in compensating trucks. With the double bridge drive, one motor is located on the outside of each main girder. Cranes required for wide building spans are furnished with outrigger girders located on the extreme outside of the main girders, and relieve these girders of the overturning forces that are otherwise caused by the driving mechanism and footwalks.

The electrical control of a stripper crane, while not especially complicated, requires specific details to provide a thoroughly safe and workable equipment. The tongs hoist lends itself well to conventional reversing dynamic lowering controller with a main circuit limit stop to prevent overtravel. The stripping screw drive requires a reversing plugging control and since the speed is relatively low and the travel short no provision for slowdown or speed limiting is actually needed although an armature shunt was occasionally used on the older type machines. To stop the drive at the extreme limits of travel a control circuit limit switch of the traveling nut type, adjusted to disconnect the motor and set the brake well in advance of the mechanical limits of travel, is usually employed.

A simple reversing-plugging controller, with a rotating cam type limit switch to stop the drive at the open and closed position, is used on the crank operated tongs opening mechanism. The trolley drive control is conventional requiring only a reversing-plugging controller of the usual type.

Since the operator's cab travels with the trolley some attention must be given to the bridge travel equipment to obtain safe and satisfactory control of this motion. In normal operation entirely adequate control is furnished by a reversing-plugging controller equipped with a plugging relay capable of accurate adjustment. With such a controller the bridge travel may be operated smoothly and accurately as long as power is available.

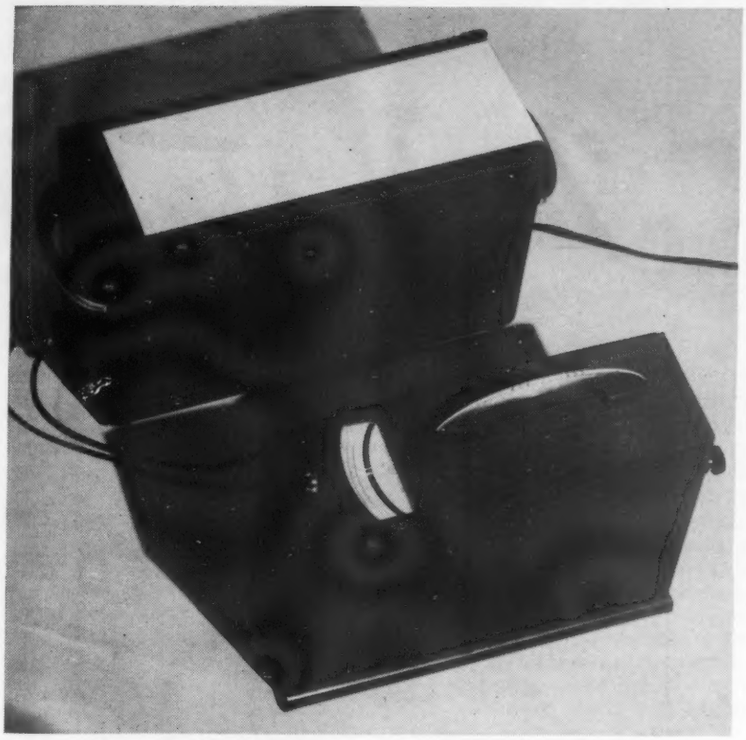
Emergency Brake Provided

In the event of power failure, robbing the operator of the ability to plug the drive motor to stop the motion, there must be available some means of stopping the travel automatically since the traveling cab makes impractical the use of any type of mechanical or hydraulic bridge brake. For this purpose a shunt-wound shoe brake ordinarily is used on the bridge drive motor which sets immediately upon power failure but remains released under normal operating conditions. A foot switch in the cab connected to the brake contactor on the bridge panel also provides a means for the operator to set brake in emergency.

The control of all motions should be of the full magnetic type with overload protection on each control panel. A safety disconnect knife switch for opening the main power lines to the crane customarily is located on the footwalk at the point where the operator boards the crane. A similar switch also is located on the operator's cab.

Brakes are used on all motions of the crane, the one on the trolley drive usually being of the hydraulically operated type, the balance being full torque brakes, series wound, except for the bridge brake which is shunt wound, as described.

Some of the steel plants are using what is known as stationary floor type ingot stripper, used with inverted molds and operated by a single motor which automatically opens and closes the links in addition to operating the stripper screw.



REFLECTANCE COMPARATOR

matches color of porcelain enamel

By F. H. CATLIN
and
F. L. MICHAEL
Works Laboratory, General Electric Co.,
Erie, Pa.

Fig. 1—This is the double-unit reflectance comparator. The unit with the handle is the one placed on the surface to be tested; when not in use, it is placed on top of the power unit which carries a standard reference panel for calibrating the setup

■ In the production of articles where several different porcelain enameled pieces or parts are assembled together, such as refrigerators, ranges and the like, a good color match between these several parts is most essential. The customer appeal of the finished article is materially reduced if there is too great a variation in the color of the several assembled parts. Therefore, it is important to control the color of all parts so assembled, between limits wherein a satisfactory commercial match is obtained.

It has been our experience that color matching by eye, using standard color limit panels, is not altogether satisfactory, due to eye defects and fatigue, and the difficulties encountered with various lighting conditions. Color matching by instrument seems to be the logical means of control of this important problem.

Features which are desirable in a color matching instrument for production use are: First, the instrument should be simple in operation so it can be used by unskilled shop workers. Second, it should give good accuracy and possess permanence of calibration, thereby insuring reproducibility of results. Third, the light source should be such that it provides good intensity of light over the entire visible spectrum.

Fourth, the instrument should view a sufficiently large area of the part being measured so small defects and minor spraying variations will be integrated in the result. Fifth, the instrument should use 115-volt 60-cycle shop power supply. Sixth, it should afford rapid measurement so it can be economically used on the entire production.

An instrument incorporating all of these features was constructed by the Erie (Pa.) Works Laboratory of the General Electric Co. This original instrument, together with one of a newer design, has been used on the production line for over a year with very satisfactory results.

The use of this instrument has simplified our color matching problem considerably. An enamel of definite basic color has been adopted as our standard exterior finish, and the instrument has been calibrated directly in terms of this enamel. Reflectance limits have been set up, and all exterior parts sent to the assembly line must fall within them.

The range of acceptable reflectance is sufficiently restricted so that all parts falling within it will produce a good commercial color match. All reworked parts and parts falling outside are coated with special color-adjusted enamel which, when fired, will bring the part within the accepted color range. Complaints from the assembly line for poor color match *have been entirely eliminated.*

In the past, color matching of replacement parts had been a difficult problem. However, under our present system, replacement parts can be taken directly from current production parts, or at least be enameled along with current production work.

This reflectance comparator, Fig. 1, consists of two units—the power unit and the measuring hood. The power unit consists of a voltage regulating transformer, and a rheostat for compensation of lamp deterioration. A standard reference panel is mounted on the top of this unit. It is shown as the far unit in Fig. 1.

The measuring hood consists of a daylight fluorescent light source, anodized aluminum reflector and a ground glass diffusing screen, measuring cells, microammeter, lamp auxiliary and bucking cells with suitable means for adjustment. The measuring scale reads directly in per cent reflectance, having been calibrated with a set of reference panels the reflectance of which had been previously measured on a G-E photoelectric photometer.

The instrument is allowed to warm up for at least ½-hour with the measuring hood in position on the reference panel before any readings are made.

Any necessary adjustment of the mechanical zero and indicating pointer are also made before the instrument is used.

The instrument is simple to operate. After noting that the proper

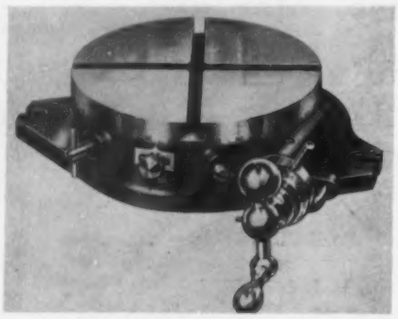
(*Please turn to Page* 92)

Presented at Central District Enamelers' Club, Cleveland, March 14, 1941.

Industrial

Rotary Table

■ Machinery Mfg. Co., 1915 East Fifty-first street, Vernon, Los Angeles, has introduced a new 7-inch Vernon rotary table for heavy-duty use. It is substantially ribbed to prevent distortion and its low lever (2¾ inches) affords maximum working space. Each of its 4 quadrants is graduated in degrees from 0 to 90 and its friction loaded worm dial is calibrated into 240 minutes, insuring instant setting. The table



movement is registered against an adjustable point and the worm gear is hobbed integrally with the table. The former may be disengaged readily to permit free wheeling of table. A quick-setting thumbscrew type lock assures positive setting.

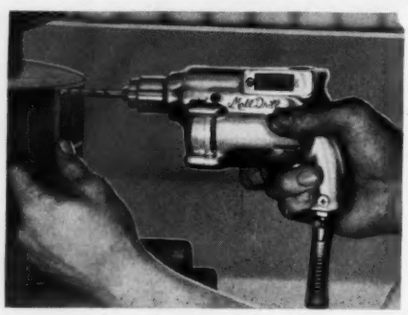
Shell Finishing Machine

■ James Coulter Machine Co., Bridgeport, Conn., has introduced an automatic shell finishing machine which finishes a brass shell case about three times faster than was possible in the last war. Operator is required only to load, start and unload the machine. Other operations are performed automatically. These include facing and forming the head end; boring and counterboring the primer hole, and turning to length and chamfering inside and outside of open end of the case. Sequence of these steps is regulated by a control shaft

driven by a 5-horsepower motor. The control shaft also can be operated by hand for setting tools or other adjustments. The work and the back control shaft are placed in motion by means of a control button. Cutting speeds are 1000 to 1500 feet per minute, and the complete cycle requires ½-minute. After the facing tool completes its cut it swings away from the work and returns to rest quickly. Likewise, the priming hole tools move up from the center of the spindle after the boring operation. The work spindle is connected directly to a 15 or 20-horsepower motor by a chain drive. An automatic brake stops the work quickly once cycle of operations has been completed.

Pistol-Grip Drill

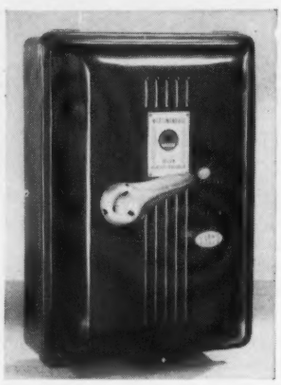
■ Mall Tool Co., 7740 South Chicago avenue, Chicago, announces a new pistol-grip ¼-inch drill for use in the airplane and auto industries. Featuring a streamlined design, the unit has a no load speed



of 2200 revolutions per minute and a full load speed of 1800 revolutions per minute. It has easily accessible openings for cleaning the commutator and for brush inspection. All ball bearings are lubricated by bearing manufacturer to insure proper amount, as well as proper lubricant. Its armature is balanced to insure smooth operation. The drill weighs 4 pounds with cord.

Circuit Interrupter

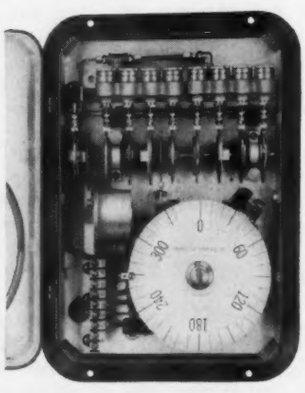
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced a new nonautomatic enclosed circuit interrupter designed to replace nonautomatic disconnecting devices used in industrial plants. Known as the NEMA Type 1A, this sheet steel dust resisting unit has a 50 to 600 amperes rating on 250 to 600 volts alternating current and 125/250 and 250 volts direct current lines. All its main contacts are of non-



welding silver or special silver composition. De-ion arc quenchers are used to reduce contact burning and preserve the contacts. Safety features include a cover interlock which prevents closing of contacts when cover is open, and opening of cover when interrupter is in the "on" position.

Cycle Controller

■ Bristol Co., Waterbury, Conn., announces a new model A-118 multiple-cam time cycle controller for timing mechanical operations in industrial processes. It is designed for use where a number of factors



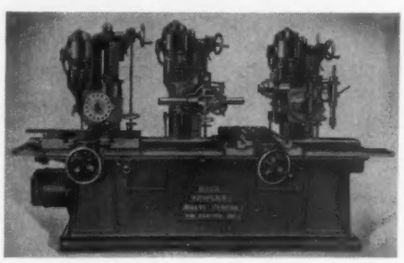
must be accurately timed according to a fixed program. Time measurement and pilot valve operation in the unit are handled by separate

Equipment

mechanisms. Timing is accomplished by a Telechron-driven aluminum disk on which is printed a 25-inch time scale. The desired schedule of operations is incorporated into the controller by punching holes with an ordinary ticket punch on the time scale. The location of these holes determines the time of operation of the cam mechanism. The cams are individually adjustable and their setting does not require fine adjustment in order to get accurate results. All controllers are drilled for eight cams and pilot valves.

Toolroom Machines

■ Hack Machine Co., 1228 Harding avenue, Des Plaines, Ill., has placed on the market two new machines —a Hack duplex and a triplex multiversal machine for light or heavy



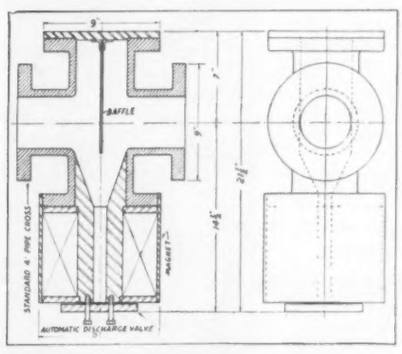
production machine shop work and the machining of complicated parts for defense in both ferrous and aluminum alloys. The former is a 2-column machine. Its boring bar has a travel of 18 inches and can be rotated 360 degrees to bore holes at various angles. It is fitted with a taper at both ends, and will machine work on either left-hand or right-hand tables. The Triplex machine has a third column at the extreme right normally fitted with a radial drill head but so constructed as to permit the use of any of the regular attachments. The column at the extreme left has an adjustable reciprocating motion but the middle and right hand columns are stationary. These last two columns may be interchanged to meet the users requirements and additional columns may be added to complete a sequence of operations with one pass of the table. Feature of this machine is that jigs and tools in many cases can be completely machined without removing the work, and a sequence of operations performed such as vertical milling, angular milling, horizontal milling, horizontal boring, radial drilling, vertical horizontal and angular jig boring, slotting and many other operations. It is equipped with vernier scales in all directions and has speeds adaptable to the machining of aluminum alloys as well as cast iron, mild steel and tool steel.

Stamping Type

■ Acromark Corp., 251 North Broad street, Elizabeth, N. J., has placed on the market a new precision stamping type for use in gang holders or mortised dies to number parts. It is of shock resisting alloy tool steel, and is suitable for stamping steel, alloy steel, cast iron and other metals or materials. The type is available in all sizes from 1/32 to 1 inch.

Magnetic Separator

■ Dings Magnetic Separator Co., 572 East Smith street, Milwaukee, announces a new type of magnetic separator for removing small particles of iron from circulating cut-



ting compounds. It consists of a baffle installed in the pipe cross, which deflects the flow of liquid to the poles of a high intensity electro magnet. Thus considerable portion of iron can be allowed to accumulate on the magnet poles before cleaning is necessary. Cleaning is accomplished by interrupting the current to the magnet. The magnet thus becomes de-energized and releases the accumulated iron and also the automatic discharge valve. A suitable rectifier for supplying direct current also is supplied with the unit.

Strap Holder

■ Signode Steel Strapping Co., 2600 North Western avenue, Chicago, has developed a new strap holder designed to increase efficiency in the shipping room. Known as the model 11 "strap holder", it may be used under a bench or packing table. It also is designed for use as a portable reel. The unit is equipped with casters, affording quick and easy

transfer of strapping to any part of the shipping department. When so used, a detachable handle to facilitate movement of the strap holder is available.

Bearings

■ Harris Products Co., 5408 Commonwealth avenue, Detroit, announces a new line of Torflex bearings with inner walls of a thinner material of either plain or graphited bronze on steel which have increased resistance to pounding and shock. These are available in a considerably wide range of sizes and shapes on shorter notice than the older cast styles.

In the new style the required sizes are readily cut from sheets, shaped, and in the split form are quickly assembled with the rubber insulating wall and outer wall. In the plain bronze form, the new material is manufactured by bonding selected powdered bronze to steel sheet. In graphited-bronze form, the graphite is thoroughly mixed with the powdered bronze before bonding.

With the thinner wall section the rubber wall surrounding it can be almost any thickness necessary to handle radial loads imposed or to compensate for misalignment, to stop vibration and transmission of noise.

Fitting by Welding

(Continued from Page 78)

and the motor base box beam frame was set on the upper end of the supporting beams. The whole was then tack welded solid and subsequently made into one solid unit by welding the eight joints in the structure where the beams were attached to the foot blocks on the bottom and the box beam frame at the top. The resulting motor bracket is a simple, rigid frame which serves its function effectively and yet involves almost no machining. While it can be removed from the machine by taking the eight capscrews out of the foot blocks, still it involves a minimum number of joints which might vibrate loose in service or cause inefficiency in the transmission of power from motor to machine.

Machine Tool Bases: Certain machine tools often function much more profitably on a special base. A radial drill, for example, frequently serves much better if it is placed on a base which is large enough for a part to be set up and drilled on one end of the base while the next part is being set up and laid out for drilling by the operator's helper on the other side.

An example of such a drill base of arc welded construction is shown in Fig. 4, where a radial drill with a 6-foot column and 3-foot arm is mounted in the center of a base whose top plate is 4 feet wide and 8 feet long. The whole base structure is built up like a box consisting of a moderately heavy bottom plate, two thin side plates bent at right angles at the corners and a heavy top plate. This construction is sufficiently massive and rigid to make a solid base for the drill when the arm is in any position, and to be free from diaphragming under the pressure of the drill while in operation—thus avoiding any resultant inaccuracy.

Made To Stand Punishment

After the box-like base structure was welded completely it was placed in a planer and the top plate faced to give a square machined surface from which to work while drilling. Holes then were drilled and tapped so the foot of the column could be bolted to the base structure. Next a coolant pan was built all around the base by arc welding ⅛-inch plate bent at right angles to the bottom plate, and welding the plates together at the corners. Then the coolant pump and pump cover and pipes (lower left) were attached by means of small capscrews. The drill was mounted on the base and the whole assembly placed in its location in the shop.

Holes were drilled and tapped (using the radial drill) in its base for the purpose of bolting down the cubic box-like accessory work bases.

Both the bottom and top of the accessory work bases are milled square. An air vise inside the box permits quick clamping of parts on the now square, level top plate of the unit.

Each accessory work base also is drilled and tapped at frequent intervals to allow odd-shaped special pieces to be quickly clamped down for drilling.

Both the main base and the accessory work tables are entirely arc welded steel structures. There is little likelihood that they will be sprung, cracked or shattered, even if comparatively heavy structures should be dropped on them.

Such a special base, in the light of its simplicity and relatively small investment of materials and workmanship together with its durability and all-round effectiveness, almost doubles the efficiency of the drill because it furnishes a broad, solid base capable of setting up even relatively large and complex structures for drilling and tapping operations. In machining smaller parts, the setups can be made by the operator or a helper while the drill is actually in operation, thus

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achieving maximum operating efficiency.

The effectiveness of a special arc-welded base is not confined to medium and large radial drills as is illustrated by the small power drill shown in Fig. 5. This small radial speed drill is used for sample cutting and similar jobs. The base is essentially a four-legged table made from angles welded into box sections with a heavy plate top on which has been placed a lighter plate. This top plate was set on thin shims and was faced, drilled and tapped to allow the use of cap-screws in holding small fixtures, parts and samples while being drilled.

This construction lends itself especially to laboratory use. A wood base or table would tend to pick up oil and dirt while steel does not. It is easy to clean and to clean around. A coat of paint makes it an acceptable appearing laboratory fixture. Its durability, rigidity, rugged construction and effective function combined with small outlay for materials and labor make it a distinctly successful application.

The field for special machine bases is as broad as machines and their uses. Of course there are many other instances where fabricated steel bases can be built to advantage in addition to those described.

Explains Contour Sawing in New Text

■ Continental Machines Inc., Minneapolis, announces a ninth edition of its "Contour Sawing Handbook." This edition, which supersedes volume 2 of the eighth edition, contains much added material, including a supplement carrying Leighton Wilkie's ingenious pictorial exposition of basic machine tools and fundamentals of modern machine shop practice.

The body of the book, which runs to 158 profusely illustrated pages, is a textbook, thumb indexed for quick reference. It is devoted to the history, design and modern applications of band sawing and band-type filing machines in tool rooms and also on production.

Stress is laid on methods whereby valuable metal can be saved by contour sawing shapes from sheets, plates and billets, instead of removing the excess metal in the form of chips. This applies not only to die and tool work, but also to cams, templets, and short run forgings and stampings.

Accredited vocational teachers, NYA officials, contour sawing machine operators and trainees in shops can obtain copies of this handbook free of charge by writing to the company.

$3497.70 is nothing-

to sneeze at

THERE is a job *always waiting* for your *crawler crane.* So much in demand are these machines by department heads that some firms have found it necessary to route their machines from job to job. Here is a Northwest in the Evansville, Indiana plant of the Chrysler Corporation. This machine has saved as high as $3,497.70 a year over previous methods employed. From unloading steel it progresses to handling scrap, borings and turnings, and finishes up on coal, doing odd lifting jobs in between.

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THE CRANE THAT GOES ANYPLACE

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Chicago Illinois

Built in a range of 18 sizes — 4½ to 40 tons capacity

The Garand Rifle

(*Concluded from Page 66*)

Result would be rupture about ¾-inch from the head of the case. Beyond this point, apparently, freezing against the chamber walls takes place while the rest of the case is relatively free to slide.

Speaking of this matter of cartridge case extraction, Mr. Garand further observed that an exceedingly smooth surface in the chamber of the rifle results in harder extraction on account of the increased area of contact between the surface of the chamber and the case. Further, if any sizable rings remain from a reaming operation, gas pressure forces the metal into these depressions and extremely hard extraction results. For this reason, practice at Springfield Armory calls for lengthwise honing, thereby producing longitudinal scratches which aid extraction and remove any possibility of circumferential scores. For this purpose a machine is used which drives two hones set in a holder and pressed outward against the chamber by light spring pressure. These light springs deflect easily and permit the hones to enter the chamber readily.

In operation, the honing machine reciprocates 1400 times a minute and revolves very slowly through two turns per barrel. Meantime the light spring pressure behind each hone is reinforced by the hydraulic pressure of the coolant (kerosene) which is fed through the center of each hone holder and escapes along the side of each hone. This pressure is actually in excess of the pressure applied by the springs. Honing is done with the barrel in a vertical position, chamber end down and anchored in place. This position causes the bulk of the coolant to drain by gravity, that which remains being thoroughly drained by placing the barrel in a suitable rack.

Production operations on the Garand rifle at Springfield Armory will be detailed in the second part of this article scheduled to appear in STEEL, Oct. 13, 1941.

(*Concluded Next Week*)

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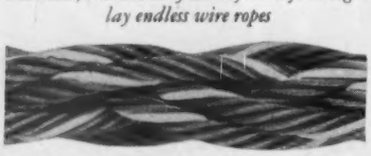

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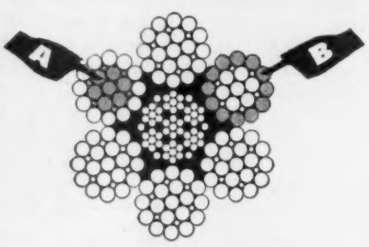

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Issues New Technical Manual on Plastics

■ In view of the numerous advancements in the plastics field, Bakelite Corp., Dept. T, 30 East Forty-second street, New York, in collaboration with the Plastics Division of Carbide & Carbon Chemicals Corp., has recently issued a new edition of "Molding Technic for Bakelite and Vinylite Plastics". The fourth edition to be published thus far, this manual contains 226 pages of factual technical data covering molding practices for both hot-set and cold-set molding plastics. It includes some 177 illustrations and line drawings.

Some of the topics covered in the 14 chapters are principles of molding, proper mold and product design, molding plant layout, heating media, weighing, measuring and preforming, finishing molded parts, accessory equipment and molding plant cost accounting. One chapter is devoted entirely to conversion tables, mensuration formulae, steam and pressure tables and other engineering data. The price of each copy is $3.50.

Iron Powder

(*Continued from Page 59*)

Apparent inability of producers as yet to supply a powder entirely suitable from the standpoint of purity, particle size and shape, freedom from oxides, etc., and at a reasonable price.

Although in the metals product field powdered iron is "arriving" fast, the need is still imperative for material of higher purity. One source estimates the industry could

use 50,000 pounds a day of 99 per cent pure powdered, and this quantity might easily be doubled or tripled in the space of a year. In perfecting processes for producing commercial tonnages of such a material, it is suggested the primary need is for a proper admixture of mechanical engineering and metallurgical engineering talent in the designing and operating personnel. There is no particular trick to the mere "making" of some sponge iron. It can be done by a tyro in the chemical laboratory. But to produce 50,000, 100,000 or 150,000 pounds every day in the week, with unvarying purity of 99 per cent and at a price of 8, 10 or 12 cents a pound with some margin for profit is another story.

The veil of secrecy and mystery which appears to have been drawn around developments both in preparation and use of iron powders, while often necessary for patent reasons, does not tend to accelerate progress of the industry. A more outspoken and frank discussion of problems and requirements, even in the past ten years, might have resulted in a much more widespread acceptance of the product, and at the same time would have spurred engineering work in development of new parts of powdered iron. In the long run this might have meant greater profits for both user and supplier.

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For salvage welding of carbon chrome, and carbon moly castings or other cast alloys of similar characteristics which are to be heat treated after welding. (Note the treatment of welded shrink cracks on heavy plate at right.)

"HARNIMOLY"—

Easily Machined in As-Welded State . . . Responds to flame hardening or heat treatment, up to hardness of 415 Brinell.

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ADVERTISING PAGES REMOVED

Reflectance Comparator

(*Concluded from Page* 85)

reflectance value of the reference panel is being indicated on the measuring scale, the measuring hood is then placed in position on the surface of the part to be measured. The reflectance value is immediately indicated on the measuring scale. Readings can be taken at various points on the production part and the desired degree to which the uniformity of enamel coating is controlled. Readings are generally made on areas which are immediately adjacent to another matching part.

Variations noted in readings on the same piece at different locations show the sprayer where the application is too light, or too heavy, and thereby help him to improve his spraying. After the desired number of readings on one piece are made, the hood is then placed on another part and the process repeated. Between readings on production parts, the measuring hood should be checked frequently on the reference panel. During periods where the instrument is not being used, the measuring hood should be placed in position on the reference panel on top of the power unit.

The value indicated on the instrument scale is the actual reflectance of the surface being measured, only when the basic color characteristics of the enamel coating on the part are the same as those of the enamel on the reference panels used to calibrate the instrument. Values of readings made on an enamel coating having a different basic color than that used in calibrating the instrument therefore will be only an approximate reflectance value. The amount of deviation from actual reflectance will depend directly on the degree of basic color difference.

It should also be remembered that only parts coated with enamel of similar basic color characteristics should be compared for color matching.

When used as described, this reflectance comparator has been found to offer: Simplicity in operation, requiring no skilled operator; accuracy of readings which insures excellent control of color of production parts at all times; elimination of the necessity of segregating parts into matched sets; elimination of all color matching complaints.

Fig. 2—Here the comparator is shown in use, placed on the surface to be compared. It affords a quick, accurate check on colors, making a more effective match than the human eye. Being entirely independent of the human equation, it is thus an important improvement

Offers Symposium On Color and Its Uses

■ An 86-page publication entitled "Symposium on Color" — dealing with its specification and use in evaluating the appearance of materials—has been issued jointly by the Inter-Society Color Council and the American Society for Testing Materials.

Besides an introduction covering the attributes of colors and the distinction between the psychological definition of color and the technical definition, it includes papers on "Color Specifications of Transparent Materials", "Hiding Power and Opacity", and "Color Standards for Opaque Materials". The two closing papers deal with the practical problems of color testing. Copies of this booklet may be obtained from the A.S.T.M. headquarters, 260 South Broad street, Philadelphia, for $1 each.

Strength of Materials In Simplified Text

■ *Strength of Materials*, by John W. Breneman; cloth, 145 pages, 6 x 9 inches; published by McGraw-Hill Book Co., New York, for $1.50.

The author is associate professor of engineering mechanics at the Pennsylvania State College and the book was prepared under direction of the division of engineering extension of that school. The text was written to meet needs in the field of industrial training by providing an adequately simplified discussion of the principles involved. It is well adapted to those desiring to study at home and has been given a thorough test before being issued in book form.

Illustrative numerical examples have been solved without omission of any step, adding greatly to their value for study purposes. The problems have been taken from practical fields of engineering and design and incorporate fundamental principles of mechanics and strength of materials.

The subject includes the usual topics of tension and compression; riveted joints are explained in an up-to-date manner and welded connections are included. Beam design is thoroughly discussed and beam deflections are considered. The design of timber and steel columns is covered by the latest methods and equations of design.

First Scrap Shortage Curtailment Appears

Several open hearths dropped and situation is critical. New September iron ore record. Pig iron rate at all-time high in September

MARKET IN TABLOID ★

Demand
Revives after September lull.

Prices
Ceilings closely observed.

Production
Continues at 96 per cent.

■ EXPECTED curtailment of steel production resulting from scrap shortage now has begun to appear. At least five open hearths were taken off last week by producers in Ohio and Pennsylvania. At Chicago the situation is critical and unless scrap supply is larger in the next few weeks steel output will be seriously cut in November. Detroit steelmakers have so little material on hand that they may be forced to take off some open hearths this week.

Recent action by OPM to allow higher prices for remote scrap is not considered an important factor in future supplies as much of this material was picked up before Sept. 1, when ceiling prices were being violated.

September bookings, though heavy, were smaller than for several months and for the first time in many months some mills found shipments in September were equal to bookings. One cause is realization by civilian consumers that it is futile to seek more tonnage while the heavy orders now on books remain unshipped. Strict inventory control is another factor, reducing tendency to hoard. Although instances occur where consumption in manufacturing is held up by lack of material the situation is not yet as bad as feared. In by far the greater number of cases steel is being shipped as fast as needed. Last week some revival of inquiry was noted, indicating heavier demand in October.

While steelmakers are still confronted by much detailed paper work under OPM priority the situation is beginning to ease. Filing of PD-73 forms has been done by all customers of some mills and others have received them from 90 per cent of their customers. The situation is complicated by instances of tonnage already scheduled under one priority being given a higher rating, forcing numerous changes in rolling schedules.

September pig iron production at 4,725,292 net tons was third largest of all time, compared with 4,784,639 tons in August. Due to the shorter month the daily rate of production exceeded that of August and at 157,510 tons is an all-time high. The daily rate was 154,343 tons in August. Production in September was at the rate of 99.4 per cent of capacity. Blast furnaces active at the end of the month numbered 219, four more than at the end of August.

Trend of production of finished steel is shown in the report of the American Iron and Steel Institute for August. Total production was 5,573,666 net tons, which was 6.7 per cent greater than in July and 19.9 per cent greater than in August, 1940. At 42,749,649 tons, eight months output this year was 44.8 per cent greater than in the corresponding months last year.

A new extra list covering alloy steels has been issued, superseding the previous list of Sept. 1, 1940. This eliminates the former standard practice manual and conforms to the steel products manual recently issued by the American Iron and Steel Institute. Changes in practically all extras have been made to adjust to the new lineup.

Lake Superior iron ore shipments in September set a new record for that month, at 10,311,517 gross tons, compared with 9,990,618 tons in the same month last year. This fell below the all-time high made in August, 11,496,303 tons. To Oct. 1 cumulative shipments for the season totaled 62,024,228 tons, 13,789,001 tons over the same period in 1940. This is close to the record total for an entire season, 65,204,600 tons, set in 1929.

Production was unchanged last week at 96 per cent for the third consecutive week. Chicago gained ½-point to 101.5, Wheeling 3 points to 94, Cleveland 2 points to 97.5 and Detroit 2 points to 89 per cent. Eastern Pennsylvania declined 1 point to 94, New England 7 points to 83, Cincinnati 2 points to 81 and St. Louis 8 points to 83. Rates were unchanged in the remaining districts; Pittsburgh 98, Buffalo 90.5, Birmingham 95 and Youngstown 98 per cent.

Automotive builders last week produced 76,820 units, compared with 78,535 the preceding week. This compares with 105,153 in the corresponding week last year.

Composites, based on fixed prices under OPM, remain unchanged at $56.60 for finished steel, $38.15 for iron and steel and $19.16 for steelworks scrap.

COMPOSITE MARKET AVERAGES

	Oct. 4	Sept. 27	Sept. 20	One Month Ago Sept., 1941	Three Months Ago July, 1941	One Year Ago Oct., 1940	Five Years Ago Oct., 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.15	$38.07	$34.67
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	53.90
Steelworks Scrap..	19.16	19.16	19.16	19.16	19.16	20.70	16.65

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Oct. 4, 1941	Sept. 1941	July 1941	Oct. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Oct. 4, 1941	Sept. 1941	July 1941	Oct. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.34
Basic, Valley	23.50	23.50	23.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	24.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	23.69
No. 2 foundry, Chicago	24.00	24.00	24.00	23.00
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.215
Malleable, Valley	24.00	24.00	24.00	23.00
Malleable, Chicago	24.00	24.00	24.00	23.00
Lake Sup., charcoal, del. Chicago	31.34	31.34	31.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$21.30
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	17.75	19.75
Heavy melting steel, Chicago	18.75	18.75	18.75	19.85
Rails for rolling, Chicago	22.25	22.25	22.25	24.05
No. 1 Cast, Chicago	20.00	21.50	21.50	17.55

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$6.25	$4.75
Connellsville, foundry, ovens	7.25	7.25	7.25	5.75
Chicago, by-product fdry., del.	12.25	12.25	12.25	11.75

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. mill, carloads.

Sheets, Strip

Hot-Rolled Sheets

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 2.10c
Granite City base 2.20c
Detroit, del. 2.20c
Pacific ports 2.65c

Cold-Rolled Sheets

Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, B'ham., base .. 3.05c
Granite City, base 3.15c
Detroit, del. 3.15c
Other Mich. pts., del. ... 2.25c
Pacific ports 3.70c

Galvanized Sheets, No. 24

Pittsburgh, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c
Granite City, base 3.60c
Pacific ports 4.05c

Corrugated Galv. Sheets

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, 29 gage, per square 3.31c
Granite City 3.38c
Pacific Ports 3.73c

Culvert Sheets

Pittsburgh, Gary, Birmingham, 16-gage, not corrugated, copper steel 3.60c, copper iron 3.90c, pure iron 3.95c.
Pittsburgh, 24-gage, zinc-coated, hot-dipped, heat-treated 4.25c.
Granite City, copper steel 3.70c, copper iron 4.00c, pure iron 4.05c.
Pacific ports, copper steel 4.25c, copper iron 4.55c, pure iron 4.60c.

Enameling Sheets

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c
Granite City, base 2.85c
Pacific ports 3.40c
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c
Granite City, base 3.45c
Pacific ports 4.00c

Electrical Sheets, No. 24

	Pittsburgh Base	Pacific Ports	Granite City	Base Deliv. Mahoning Valley Points
Field gr.	3.20c	3.95c	3.30c	3.275c
Armat.	3.55c	4.30c	3.65c	3.625c
Elect.	4.05c	4.80c	4.15c	4.125c
Motor	4.95c	5.70c	5.05c	5.025c
Dynamo	5.65c	6.40c	5.75c	5.725c
Transformer				
72 ...	6.15c	6.90c	.....	6.225c
65 ...	7.15c	7.90c	.....	7.225c
58 ...	7.65c	8.40c	.....	7.725c
52 ...	8.45c	9.20c	.....	.....

Hot-Rolled Strip

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c
Detroit, del. 2.20c
Other Mich. pts. del. ... 2.25c
Pacific ports 2.75c

Cold-Rolled Strip

Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c
Chicago, base 2.90c
Worcester, base 3.00c
Detroit, del. 2.90c
Other Mich. pts. del. ... 2.95c

Commodity C.R. Strip

Pittsburgh, Cleveland, Youngstown, base 3 tons and over 2.95c
Worcester, base 3.35c
Detroit, del. 3.05c
Other Mich. pts. del. ... 3.10c

Cold-Finished Spring Steel

Pittsburgh, Cleveland, base; add 20 cents for Worcester.
.26-.50 Carbon 2.80c
.51-.75 Carbon 4.30c
.76-1.00 Carbon 6.15c
Over 1.00 Carbon 8.35c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

TYPE	BARS	PLATES	SHEETS	H. R. STRIP	C. R. STRIP
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
304-20% clad	.....	*18.00	19.00	.....	.....
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
316	40.00	44.00	48.00	40.00	48.00
317	50.00	54.00	58.00	50.00	58.00
347	33.00	38.00	45.00	33.00	42.00
403	21.50	24.50	29.50	21.25	27.00
410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
430F	19.50	22.50	29.50	18.75	24.50
431	19.00	22.00	29.00	17.50	22.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

*Includes annealing and pickling.

Tin, Terne Plate

Tin Plate

Pittsburgh, Chicago, Gary, 100-lb. base box $5.00
Granite City $5.10

Tin Mill Black Plate

Pittsburgh, Chicago, Gary, base 29 gage and lighter 3.05c
Granite City 3.15c
Pacific ports, boxed 4.05c

Long Ternes

Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c
Pacific Ports 4.55c

Special Coated Mfg. Ternes

Pittsburgh, Chicago, Gary, 100-base box $4.30
Granite City $4.40

Roofing Ternes

Pittsburgh base per package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Steel Plate

Pittsburgh, Chicago, Gary, Cleveland, Birmingham,

Youngstown 2.10c
Coatesville, Sparrows Point, Claymont 2.10c
Gulf ports 2.45c
Pacific Coast ports 2.65c

Steel Floor Plates

Pittsburgh 3.35c
Chicago 3.35c
Gulf ports 3.70c
Pacific Coast ports 4.00c

Structural Shapes

Pittsburgh, Bethlehem, Chicago, Buffalo, Birmingham 2.10c
St. Louis, del. 2.34c
Pacific Coast ports 2.75c

Bars

Hot-Rolled Carbon Bars

Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Duluth, base 2.25c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Rail Steel Bars

Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Hot-Rolled Alloy Bars

Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size 2.70c
Detroit 2.80c

Alloy		Alloy	
S.A.E.	Diff.	S.A.E.	Diff.
2000.....	0.35	3100.....	0.70
2100.....	0.75	3200.....	1.35
2300.....	1.70	3300.....	3.80
2500.....	2.55	3400.....	3.20

4100 .15-25 Mo. 0.55
4600 0.20-0.30 Mo.; 1.50-2.00 Ni. 1.20
5100 80-1.10 Cr. 0.45
5100 Spr. flats 0.15
6100 Bars 1.20
6100 Spr. flats 0.85
Carb., Van. 0.85
9200 Spr. flats 0.15
9200 Spr. rounds, squares 0.40
T 1300, Mn, mean 1.51-2.00 0.10
Do., carbon under 0.20 max. 0.35

Cold-Finished Carbon Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs. 2.65c
Detroit 2.70c

Cold-Finished Alloy Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

Turned, Ground Shafting

Pitts., Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c
Detroit 2.70c

Reinforcing Bars (*New Billet*)

Pitts., Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Reinforcing Bars (*Rail Steel*)

Pitts., Chicago, Gary, Cleveland, Birm., base. 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Iron Bars

Philadelphia, com. del. 3.06-3.50c
Pittsburgh, muck bar ... 5.00c
Pittsburgh, staybolt 8.00c
Terre Haute com., f.o.b. mill 2.15c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails $2.55

(Per Pound)

Polished fence staples .. 2.55c
Annealed fence wire 3.05c
Galv. fence wire 3.40c
Woven wire fencing (base C. L. column) 67
Single loop bale ties, (base C. L. column) .. 59
Galv. barbed wire, 80-rod spools, base column .. 70
Twisted barbless wire, column 70

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago Birmingham (except spring wire at Birmingham)

Bright bess., basic wire. 2.60c
Galvanized wire 2.60c
Spring wire 3.20c
Worcester, Mass., 10c higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg. $3.85

Alloy Plates (Hot)

Pitts., Chicago, Coatesville, Pa. 3.50c

Rails, Fastenings

(*Gross Tons*)

Standard rails, mill $40.00
Relay rails, Pittsburgh 20—100 lbs. 32.50-35.50
Light rails, billet qual., Pitts., Chicago, Bham. $40.00
Do., rerolling quality.. 39.00

Cents per pound

Angle bars, billet, mills. 2.70c
Do., axle steel 2.35c
Spikes, R. R. base 3.00c
Track bolts, base 4.75c
Do., heat treated 5.00c
Car axles forged, Pitts., Chicago, Birmingham.. 3.15c
Tie plates, base 2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller.....65½ off
Do., ⅞ and ⅝ x 6-in. and shorter .....63½ off
Do., ¾ to 1 x 6-in. and shorter .....61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long .....59 off
Tire bolts .....50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts .....56 off
Plow bolts .....65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger..	56	.

Hexagon Cap Screws

Upset 1-in., smaller .....60 off

Square Head Set Screws

Upset, 1-in., smaller ....68 off
Headless, ¼-in., larger ..55 off
No. 10, smaller .....60 off

Piling

Pitts., Chgo., Buffalo .. 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
⅞-inch and under .....65-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. .....$4.00 off

Tool Steels

Pittsburgh, Bethlehem, Syracuse, base, cents per lb.

Carb. Reg. 14.00 Oil-hardening .. 24.00
Carb. Ext. 18.00
Carb. Spec. 22.00 High car.-chr. 43.00

High Speed Tool Steels

Tung.	Chr.	Van.	Moly.	
18.00	4	1	...	67.00
18.00	4	2	1	77.00
18.00	4	3	1	87.00
1.50	4	1	8.50	54.00
....	4	2	8	54.00
5.50	4	1.50	4	57.50
5.50	4.50	4	4.50	70.00

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Welded Iron, Steel, Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	51
¾	66½	55
1—3	68½	57½

Iron

¾	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel

2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½

Iron

2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

Line Pipe, Plain Ends

Steel

1 to 3, butt weld..... 68½
2, lap weld 63
2½ to 3, lap weld 66
3½ to 6, lap weld 65
7 and 8, lap weld 64
Seamless, 3 pts. lower discount.

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm. .$45.00-46.00
4-in., Birmingham .. 48.00-49.00
4-in.. Chicago 56.80-57.80
6-in. & over, Chicago 53.80-54.80
6-in. & over, east fdy. 49.00
Do., 4-in 52.00
Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(*Gross Tons*)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point..$34.00
Duluth (billets) 36.00
Detroit, delivered 36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.. 40.00
Duluth 42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago. 34.00
Detroit, delivered 36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.) $2.00
Do., over ⅝ to 41/64-in. incl. 2.15
Worcester up $0.10, Galveston up $0.25 and Pacific Coast up $0.50 on water shipments.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch $52.00
12-18-inch 54.00
18-inch and over 56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.. $6.00- 6.25
Connellsville, fdry.. 7.00- 7.50
Connell. prem. fdry. 7.25- 7.60
New River fdry. .. 8.00- 8.25
Wise county fdry. .. 7.50
Wise county fur. .. 6.50

By-Product Foundry

Newark, N. J., del... 12.60-13.05
Chicago, outside del. 11.50
Chicago, delivered .. 12.25
Terre Haute, del. .. 12.00
Milwaukee, ovens... 12.25
New England, del. .. 13.75
St. Louis, del. 12.02
Birmingham, ovens. 8.50
Indianapolis, del. .. 12.00
Cincinnati, del. 11.75
Cleveland, del. 12.30
Buffalo, del. 12.50
Detroit, del. 12.25
Philadelphia, del. .. 12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol.... 14.00c
Toluol, two degree 27.00c
Solvent naphtha 26.00c
Industrial xylol 26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.) 14.25c
Do. (1000 lbs. or over) 13.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers 7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia $30.00

Pig Iron

No. 2 foundry is 1.75-2.25 sil.; 50c diff. for each 0.25 sil. above 2.25 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
Boston from Birmingham†	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.12	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.50	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

Silvery

Jackson county, O., base, 6.00 to 6.50 per cent $29.50. Add 50 cents for each additional 0.25 per cent of silicon. Buffalo base $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

Manganese differentials in silvery iron and ferrosilicon not to exceed 50 cents per 0.50 per cent manganese in excess of 1 per cent.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.35
Georgia, Alabama	38.00
New Jersey	49.00

Ohio

First quality	43.00
Intermediate	36.10
Second quality	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide. net ton	nominal
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$23.00
Do., barge	23.00
No. 2 lump	23.00

Ferroalloy Prices

Ferromanganese, 78-82%, Carlots, duty paid, sbd. $120.00
Carlots, del. Pitts. 125.33
Carlots, f.o.b. Southern furn. 145.00
For ton lots add $10, for less-than-ton lots $13.50, for less than 200-lb. lots $18.

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 2½ per cent carbon 118.00
1½% carbon 128.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c.l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 13.00c
Do., ton lots 13.75c
Do., less-ton lots 14.00c
less than 200 lb. lots 14.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	19.50c	20.25c	20.75c
1% carb.	20.50c	21.25c	21.75c
0.10% carb.	22.50c	23.25c	23.75c
0.20% carb.	21.50c	22.25c	22.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Molybdenum Oxide, lb. Molyb. cont., 5-20-lb. containers, f. o. b., Washington, Pa., and Langeloth, Pa., lb. 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00
15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 8.25c
Do., ton lots 8.75c
Do., less-ton lots 9.00c
Do., less 200 lbs. 9.25c
Spot ¼c lb. higher

Tungsten Metal Powder, 98-99 per cent, per lb., depending upon quantity $2.50-2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c
88% chrome, cont. tons 79.00c
Do., spot 84.00c

Silicon Metal, 1% iron, contract carlots, 2 x ⅛-in., lb. 14.50c
Do., 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50
Ton lots 84.50
Less-ton lots, lb. 4.00c
Less 200 lb. lots, lb. 4.25c
Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c
Ton lots 6.00c
Less-ton lots 6.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., ton 108.00
35-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	5.26	3.31	4.06	8.56	7.10
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.85	5.25	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	...	5.00	....	4.30	....	....
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Memphis	4.15	4.35	4.35	4.20	4.20	5.96	4.35	....	6.00	....	4.56	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	4.10	4.10	5.50	4.20	....	5.25	....	7.15	....	....
Seattle	4.00	4.00	5.20	4.75	4.75	6.50	4.75	7.25	6.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	5.45	7.25	4.95	4.95	7.20	5.10	7.30	6.30	....	6.60	11.35	10.35
San Francisco	4.00	5.20	6.80	4.70	4.70	6.40	4.70	7.20	6.45	....	7.05	11.60	10.60

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	...
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.45	..	8.75	8.60	9.40
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	6.05	10.60	9.60	9.45	10.10

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis; Los Angeles, bars over 4-in. wide, 1-in. thick, 4.95c.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 1 to 10 bun. in Los Angeles; 300 and over in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis ,Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; any quantity in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle, 1 to 99 pounds in Los Angeles; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	£	s	d
Merchant bars, 3-inch and over	$66.50	16	10	0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20	0	0
Structural shapes	2.95c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1	10	9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

	£	s	d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6	8 0(a)
Basic pig iron	24.28	6	0 6(a)
Furnace coke, f.o.t. ovens	7.40	1	16 9
Billets, basic soft, 100-ton lots and over	49.37	12	5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12 0††
Shapes	2.77c	15	8 0††
Ship plates	2.91c	16	3 0††
Boiler plates	3.06c	17	0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15 0
Bands and strips, hot-rolled	3.30c	18	7 0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents unit, del. E. Pa.

Foundry and basic 56-63%, contract	12.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00-25.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton	.....

Manganese Ore

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	.....
So. African, 50%	68.00-70.00
Indian, 50%	68.00-70.00
Brazilian, 46%	68.00-70.00
Chilean, 47%	68.00-70.00
Cuban, 50-51%, duty free	.....

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

OTHER THAN RAILROAD GRADES (a) (b)	Pittsburgh, *Wheeling *Johnstown, Weirton, Steubenville	Youngstown, *Warren, Canton, Sharon	Chicago	Kokomo, Ind.	Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	*Cincinnati Ashland, Ky. Portsmouth, O. Middletown, O.	St. Louis	Detroit	Duluth	Birmingham	Alabama City, Atlanta	*Pacific Coast	Minnequa, Colo.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.25	$18.75	$18.75	$19.50	$19.25	$19.50	$17.50	$17.85	$18.00	$17.00	$17.00(d)	$14.50	$16.50
No. 1 hyd. comp. black sheets	20.00	20.00	18 75	18.25	18.25	18.75	18.75	19.50	19.25	19.50	17.50	17.85	18.00	17.00	17.00(d)	14.50	16.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	16.50	16.85	17.00	16.00	16.00(d)	13.50	15.50
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	16.50	16.85	17.00	16.00	16.00(d)	13.50	15.50
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.25	16.75	16.75	17.50	17.25	17.50	15.50	15.85	16.00	15.00	15.00(d)	12.50	14.50
Mixed borings and turnings	15.25	15.25	14.00	14.25	13.50	14.00	14.00	14.75	14.50	14.75	12.75	13.10	.....	12.25	12.25	9.75	11.75
Machine shop turnings	15.50	15.50	14.25	14.50	13.75	14.25	14.25	15.00	14.75	15.00	13.00	13.35	15.50	15.00	15.00	10.00	12.00
Shovel turnings	16.50	16.50	15.25	15.50	14.75	15.25	15.25	16.00	15.75	16.00	14.00	14.35	16.50	16.00	16.00	11.00	13.00
No. 1 busheling	19.50	19.50	18.25	17.75	17.75	18.25	18.25	19.00	18.75	19.00	17.00	17.35	17.50	16.50	16.50	14.00	16.00
No. 2 busheling	15.50	15.50	14.25	13.75	13.75	14.25	14.25	15.00	14.75	15.00	13.00	13.35	13.50	12.50	12.50	10.00	12.00
Cast iron borings	15.75	15.75	14.50	14.00	14.00	14.50	14.50	15.25	15.00	†15.25	13.25	13.60	13.75	12.75	12.75	10.25	12.25
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.50	18.25	18.50	18.50	16.85	17.00	16.00	16.00	13.50	15.50
No. 1 cupola	21.00	21.00	20.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00	20.00	20.35	19.00	20.00	.....	18.00	.....
Heavy breakable cast	19.50	19.50	18.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50	18.50	18.85	17.50	18.50	.....	17.00	.....
Stove plate	19.00	. .	17.00	16.00	18.00	18.50	18.00	18.00	19.00	17.50	17.00	14.10	16.00	17.00	.....	14.00	.....
Low phos. billet, bloom crops	25.00	25.00	23.75	23.75	23.25	23.75	23.75	24.50	24.25	23.50	22.50	22.85	23.00	22.00	.....	19.50	.....
Low phos. bar crops and smaller	23.00	23.00	21.75	21.75	21.25	21.75	21.75	22.50	22.25	21.50	20.50	20.85	21.00	20.00	.....	19.50	.....
Low phos. punch., plate scrap**	23.00(c)	23.00	21.75	21.75	21.25	21.75	21.75	22.50	22.25	21.50	20.50	20.85	21.00	20.00	.....	17.50	.....
Machinery cast cupola size***	22.00	22.00	21.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00	21.00	21.35	20.00	21.00	.....	19.00	.....
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50	21.85	20.50	21.50	.....	19.50	.....
Clean auto cast	22.50	22.50	21.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50	21.85	20.50	21.50	.....	19.50	.....
Punchings and plate scrap††	22.00(c)	22.00	20.75	20.75	20.25	20.75	20.75	21.50	21.25	20.50	19.50	19.85	20.00	19.00	.....	16.50	.....
Punchings and plate scrap§§	21.00(c)	21.00	19.75	19.75	19.25	19.75	19.75	20.50	20.25	19.50	18.50	18.85	19.00	18.00	.....	15.50	.....
Heavy axle and forge turnings	19.50(c)	19.50	18.25	18.25	17.75	18.25	18.25	19.00	18.75	18.00	17.00	17.35	17.50	16.50	.....	14.00	.....
Medium heavy elec. furnace turnings	18.00(c)	18.00	16.75	16.75	16.25	16.75	16.75	17.50	17.25	16.50	15.50	15.85	16.00	15.00	.....	12.50	.....
GRADES ORIGINATING FROM RAILROADS															Kansas City		
No. 1 R.R. heavy melting steel	21.00	21.00	19.75	19.25	.....	19.75	19.75	20.50	20.25	20.50	18.50	18.85	19.00	18.00	17.00	15.50	.....
Scrap rails	22.00	22.00	20.75	20.25	.....	20.75	20.75	21.50	21.25	21.50	19.50	19.85	20.00	19.00	18.00	16.50	.....
††Rerolling quality rails	23.50	23.50	22.25	21.75	.....	22.25	22.25	23.00	22.75	23.00	21.00	21.35	21.50	20.50	19.50	18.00	.....
Scrap rails 3 feet and under	24.00	24.00	22.75	22.25	.....	22.75	22.75	23.50	23.25	23.50	21.50	21.85	22.00	21.00	20.00	18.50	.....
Scrap rails 2 feet and under	24.25	24.25	23.00	22.50	.....	23.00	23.00	23.75	23.50	23.75	21.75	22.10	22.25	21.25	20.25	18.75	.....
Scrap rails 18 inches and under	24.50	24.50	23.25	22.75	.....	23.25	23.25	24.00	23.75	24.00	22.00	22.35	22.50	21.50	20.50	19.00	.....

*Johnstown, Pa., Warren, O., and Cincinnati, O., not bases for railroad grades; Wheeling railroad only. Eastern Pa. includes Coatesville, Claymont, Conshohocken, Phoenixville and Harrisburg as bases only for "other than railroad grades"; Philadelphia and Wilmington are bases only for railroad grades. Pacific Coast bases are Los Angeles, San Francisco, Seattle, Portland. †Base price at Portsmouth; Middletown 25 cents less and Ashland, Ky; ††The term 'rails for rerolling' includes any rails which are sold to be used for rerolling, irrespective of whether or not such rails are usable for re-laying. **⅜-inch and heavier, cut 12 inches and under; ***may include clean agricultural cast; ‡‡under ⅜-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under. (c) add $1.75 at Pittsburgh. (d) Bases at Atlanta only.

OTHER BASE PRICES: Machine shop turnings $17.60, Alloy, W. Va., $13.35 Toledo, O.; **Shoveling turnings,** $14.35 Toledo; **cast iron borings,** $13.60 Toledo; **No. 1 cupola cast,** $19 Minneapolis and St. Paul, $20.50 Chattanooga, $21 Radford, Va. and $22 Phillipsdale, Bridgeport and Worcester; **Heavy breakable cast,** $20.50 Phillipsdale, Bridgeport and Worcester, $17.50 Minneapolis and St. Paul; **Stove plate** $16 Minneapolis and St. Paul, $17.50 Chattanooga, $18 Radford, Va., $15.60 Toledo and $17.50 Phillipsdale, Bridgeport and Worcester; **Machinery cast cupola size** $21.50 Chattanooga, $22 Radford, Va. and $23 Phillipsdale, Bridgeport and Worcester; **No. 1 machinery cast, drop broken** $22 Chattanooga, $22.50 Radford, Va. and $23.50 Phillipsdale, Bridgeport and Worcester; **Clean auto cast** $22 Chattanooga, $22.50 Radford, Va. and $23.50 Phillipsdale, Bridgeport and Worcester.

(a) The grades specified are, except dealers' No. 1 and No. 2 bundles and uncut structural and plate scrap, as named and defined in the simplified recommendations R-58-36 of the Department of Commerce which shall be the governing specifications for iron and steel scrap hereunder (other than railroad grades). Dealers' No. 1 bundles shall consist of new, clean black sheet scrap, hydraulically compressed in the dealer's yard. Dealers' No. 2 bundles shall consist of old fender and body scrap, and shall in no case command a premium. (b) These grades (other than railroad grades) represent the major classifications of iron and steel scrap. The maximum prices of superior or inferior grades shall continue to bear the same comparable relationship to those major grade classifications as heretofore existed between the prices of such superior or inferior grades and the prices of the major grades.

Maximum price at shipping point: A shipping point is the point from which the scrap is to be shipped to a consumer. Maximum price at which a grade of scrap may be sold f.o.b. its point of shipment is the shipping point of such scrap. **For shipping points located within a basing point,** the shipping point price is determined by taking the basing point price and deducting actual transportation costs to the consumer's plant within the basing point. **For shipping points outside a basing point,** the shipping point price is determined by taking the nearest basing point and subtracting the lowest transportation charge. (Example: No. 1 steel shipped from Toledo takes the Detroit base of $17.85 minus transportation of $1.52 or $16.33. This shipping point price is the same to all consumers wherever located.) **Exceptions:** Shipping point of any grade not listed as having a basing point in New England is the Johnstown base minus the all-rail freight from the shipping point to Johnstown. Shipping point prices for New York City, Brooklyn, New York and New Jersey must be computed on the basis of the Bethlehem base although nearer to Buffalo in terms of barge transportation.

Maximum prices to consumers: Maximum price at which any grade (other than railroad) may be delivered to a consumer wherever located is the shipping point price plus actual transportation charges. Where shipment is by water, not more than 75 cents per gross ton may be included for handling charges at dock. Maximum delivered price in no case shall exceed by $1 a ton the nearest maximum base price in terms of transportation charges. (Example: The $1 excess is the so-called "springboard" arrangement. Youngstown consumers can draw on the Cleveland area for No. 1 steel scrap by taking the Cleveland base of $19.50, subtracting the Cleveland switching charge of 65 cents and adding freight to Youngstown of $2.08. The resulting delivered figure of $20.93 is within the "springboard" limit of $1 over the Youngstown base of $20.)

Billet and bloom crops originating in the Pittsburgh district may be sold within or without the district at the Pittsburgh base price plus up to, but not more than $2.50 in transportation charges. Maximum prices for **unprepared scrap** shall be $2.50 a ton less than the maximums for corresponding grade or grades of prepared scrap. **Remote scrap** is material located beyond the zone from which the railroad freight rate to Pittsburgh is $11.20 and a consumer may obtain permission from OPACS to absorb transportation charges necessary to obtain 500 tons or more.

Railroad grades: Where a railroad operates in two or more basing points, the highest base applies to consumers anywhere on the line. (Example: New York Central Railroad uses the $21 Pittsburgh base on No. 1 steel since the P. & L. E. operates there). Exception: Switching charges of 84 cents a ton must be subtracted from prices on scrap originating from railroads operating in Chicago and sold for consumption outside Chicago. Where railroad scrap is shipped to an off-the-line consumer, the highest maximum on-the-line price or the nearest basing point price, whichever is higher, applies.

Commissions: Brokers are allowed a commission up to 50 cents a ton above maximum prices to consumers, including export.

Export prices: Maximum on No. 1 heavy melting steel (other than railroad) is the domestic shipping point price plus lowest transportation charge to point of export. Maximum price to a domestic consumer on line of the originating railroad plus transportation to point of export applies on No. 1 railroad steel. Customary differentials apply on other railroad and non-railroad grades.

Sheets, Strip

Sheet & Strip Prices, Page 96

While sheet demand continues heavy it is not as pressing as for plates and some other products. The situation has been eased somewhat by reduction in automobile production and the effect of change in models. Restriction of refrigerator output will also give some relief in districts where this class of manufacture is centered. Cancellations already have been made by some manufacturers.

Conversion of some sheet mills to production of light plates has resulted in heavier demand on mills which continue to roll sheets. This has the effect of increasing pressure for defense deliveries by these suppliers and a corresponding delay in furnishing material to nondefense users. Proportion of sheets required on priority continues to increase steadily.

In some cases sheetmakers can book hot or cold sheets in the lower defense ratings for December delivery, subject to delay in cases where additional high priority tonnage is booked.

Manufacturers of household equipment are being pinched for material, having no priority rating, but in many cases the considerable inventory accumulated early in the year is cushioning the lack of current shipments.

Bids on 30,000,000 cartridge clips have been submitted by 70 stamping shops and proposals are being studied at Washington. This will require 1350 tons of cold-rolled strip, which probably will be divided among three producers. About 20,000 tons of 18-gage hot-rolled sheets for munition cases to be fabricated by the Standard Container Corp., Bloomfield, N. J., is being allocated by OPM.

Plates

Plate Prices, Page 96

Plate deliveries are the tightest of any steel product and some producers claim they will be unable to ship all A-1-A tonnage demanded for delivery before the end of the year. Additional allocations are being received constantly, requiring constant changes in schedules. These allocations are in round figures, set up for a month in advance, applying broadly to top consuming groups, without itemizing tonnage for individual buyers, as is the case with pig iron. Army, navy and maritime commission requirements come first as usual, but with railroad equipment builders this month apparently scheduled for more tonnage than A-3 rating would imply. This leaves little for customers in lower brackets.

While deliveres of steel to defense plants have been increased in nearly all products, plates are an exception to the rule.

PLATE CONTRACTS PLACED

300 tons, 24-inch steel pipe, Metropolitan District Commission, Boston, for Arlington, Mass., to Walsh-Holyoke Steam Boiler Works, Holyoke, Mass.; Edward Matz Inc., Boston, contractor.

PLATE CONTRACTS PENDING

150 tons, 22-inch welded steel water pipe, East Marginal Way, Seattle; Hydraulic Supply Mfg. Co., Seattle, low $24,358.

Unstated, five subchasers; Albina Engine & Machine Works, Portland, Oreg., contractor.

Unstated, four 165-foot subchasers and four 205-foot fleet tugs; Commercial Iron Works, Portland, Oreg., contractor.

Pipe

Pipe Prices, Page 97

Distributors of merchant pipe will be given quotas for the current quarter amounting to 80 per cent of receipts for the corresponding quarter of last year, according to unofficial but reliable reports from Washington. Official announcement to this effect is expected shortly and will also undoubtedly clarify the outlook with respect to boiler tubes, mechanical tubing and specialties.

Mill deliveries are fairly prompt on butt-weld pipe and somewhat more extended on galvanized pipe as well as on lap-weld sizes, both black and galvanized. Deliveries on mechanical and boiler tubing are weeks off, due principally to pressure of demand from shipyards and aircraft builders. Practically all orders in these lines take high priorities and the only way in which relatively early de-

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Strong takes the same well earned pride in its cleaning operations that it has for its annealing facilities. In addition to the cutting, grinding and chipping processes, Strong operates two sandblasts with the larger one capable of handling any casting which comes from its 15 by 19 annealing furnace.

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STRONG STEEL FOUNDRY COMPANY, BUFFALO, N. Y.

STRONG

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liveries can be obtained is through special government allocations.

CAST PIPE PENDING

315 tons, cement-lined, bell and spigot, Panama, sch. 5566; bids in.

180 tons, 20-inch Class 200, East Marginal Way, Seattle; Hugh G. Purcell, Seattle, low, $21,884.

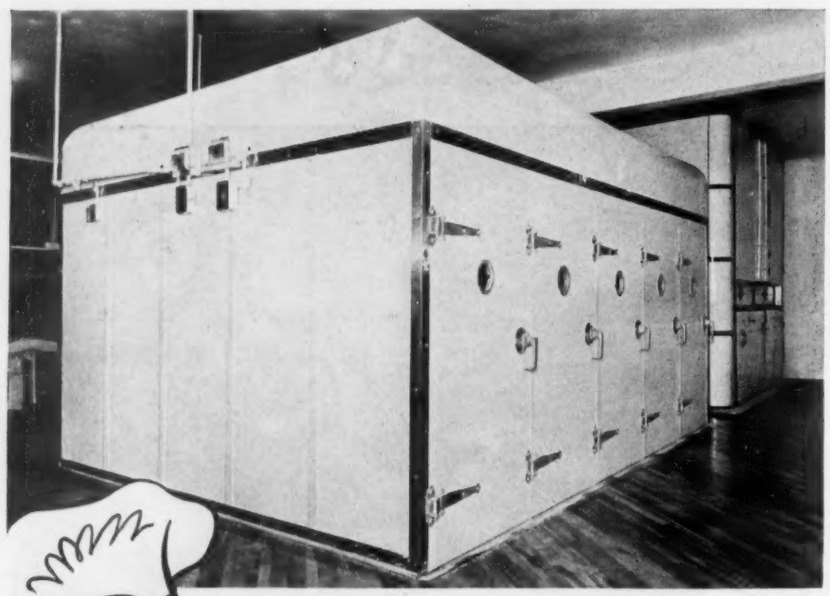
Unstated, water system extensions, Hermiston, Oreg.; bids soon.

Wire

Wire Prices, Page 97

Incoming wire orders have slackened materially, and, while bookings vary in volume, shipments last month with some mills were nearly double new tonnage. Classification and analysis of backlogs indicates some orders will not be shipped; such volume is not large but some consumers are easing pressure for wire due to shortages in other materials, while considerable tonnage on books for the automobile trade has been held up indefinitely. Current orders average about 50 per cent defense with producers not actively soliciting new volume.

Several industries are taking substantial defense contracts foreign to regular production; Waterbury Clock Co., Waterbury, Conn., for instance, has an order for fuses at $2,557,500 requiring substantial volume of wire. Demand for clock spring stock, incidentally, has been well maintained. Una Welding Inc., Cleveland, has 200,000 pounds, welding electrodes, for the Watertown, Mass., arsenal at 6.10c per pound.



When The Army Bakes Bread IT MEANS BUSINESS!

No cream-puff eaters are the men of Uncle Sam. Bread comes and goes by the tons when tired and hungry army men rush to mess calls for their "three-a-day." Naturally ovens of great capacity are needed in every camp.

Some of these are covered with attractively painted ARMCO Galvanized PAINTGRIP sheets. Paint goes on quickly, smoothly. No pretreatment is needed because the bonderized PAINTGRIP coating separates the protective zinc coating from the paint. The result is a smooth *extra-durable* surface. Field tests prove PAINTGRIP holds paint several times longer than ordinary galvanized metals.

Baking ovens are only one of the many tasks for ARMCO PAINTGRIP in America's defense effort. It is used in buildings because it preserves paints and enamels — prevents early peeling and flaking. Air ducts, airplane templates, airplane hangars, heating units, X-ray cabinets, army trucks and scout cars are a few other uses.

If you manufacture "defense" products consider the shop savings and longer-lasting products you can make with ARMCO Galvanized PAINTGRIP sheets. Just write The American Rolling Mill Company, 2961 Curtis St., Middletown, Ohio. District offices in all the key cities.

ARMCO PAINTGRIP

Rails, Cars

Track Material Prices, Page 97

Buying of rolling stock by railroads is light, in view of heavy orders placed in recent months. Deliveries are being made steadily and repair programs are proceeding as well as material supplies will allow. Car and locomotive builders are not receiving as much steel as they need for full production on the heavy orders now on books, but the situation is better than a few weeks ago.

Most current orders and inquiries are for small lots and no rail buying of normal proportions has been done. Some export inquiry is being received. Among these are 2860 freight cars for the Egyptian State Railways and eight steam locomotives for the National Steel Co. of Brazil.

CAR ORDERS PLACED

Canadian Pacific, fifty 70-ton hopper cars, to Eastern Car Co. Ltd., New Glasgow, N. S.

Chicago Great Western, 200 mercantile cars, to Pullman-Standard Car Mfg. Co., Chicago.

Chicago, Indianapolis & Louisville, 300 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Reading Co., 1000 fifty-ton hopper cars, to its own shops.

CAR ORDERS PENDING

Bessemer & Lake Erie, 500 fifty-ton gondolas and 425 ninety-ton hoppers; bids asked.

Birmingham & Southern, 100 fifty-ton box cars, and 100 seventy-ton gondolas and 10 cement cars; bids asked.

Boston & Maine, 21 all-steel baggage cars; pending.

Egyptian State Railways, 2860 freight cars, reported contemplated; list includes 1200 forty-ton steel box cars, 1200 forty-ton low side gondolas, 400 forty-ton flat cars and 60 cabooses.

Elgin, Joliet & Eastern, 1000 fifty-ton gondolas and 200 flats; bids asked.

Navy department, twelve 40-ton flat cars and ten 40-ton steel sheathed box cars, bids asked.

Reading Co., 50 seventy-ton cement cars; bids asked.

Tennessee Coal, Iron & Railroad Co., ten 70-ton air dump cars; pending.

LOCOMOTIVES PLACED

Louisiana Southern, one 45-ton diesel-electric locomotive, to General Electric Co., Schenectady, N. Y.

Stone & Webster Engineering Co., one 47-ton fireless steam locomotive, to H. K. Porter Co., Pittsburgh.

LOCOMOTIVES PENDING

Detroit, Toledo & Ironton, two to four, Mikado type steam locomotives; pending.

National Steel Co. of Brazil, eight steam locomotives, six 0-6-0 type and two 0-8-0 type; bids asked.

War department, upwards of 200 2-8-2 steam engines; reported on inquiry.

Tin Plate

Tin Plate Prices, Page 96

Tin plate sellers generally look for little slowing up in demand over the remainder of the year, notwithstanding the fact that the canning

season is about over and that normally there is a considerable drop in the last quarter.

It is believed that much demand, held back over the past few months while vegetables were being canned, will now develop. Moreover, a substantial tonnage is being shipped to the British colonies, about 35,000 tons.

In some instances terne plate has been substituted in the past for tin plate, but some of the larger producers at least have fewer lead than tin pots and consequently are better able to supply the tinned sheet. Meanwhile tin supply appears ample for current requirements.

Structural Shapes

Structural Shape Prices, Page 97

Inquiry for structural steel is moderate, compared with volume in first half of the year. Only tonnage with definite preference rating is being booked and scheduled according to its priority related to orders already on books.

Many inquiries are not being considered by producers and fabricators and considerable volume of this sort of demand is piling up, with no takers. Much of this is for state projects. In some instances preference rating has been given such projects on the ground they are essential to defense.

Some difficulty has been experienced by structural mills in obtaining sufficient semifinished material, export shipments, which had been smaller for a few weeks, again having increased.

Orders placed for fabricated shapes in August totaled 154,793 tons, the lightest for the year to date, according to the American Institute of Steel Construction, New York, compared with 205,198 tons in July and 122.468 tons in August last year. Shipments of 176,057 tons were about equal to the average for the first eight months, compared with 195,081 tons in July and 134,858 tons in August, 1940. During the first eight months the industry has booked 1,665,669 tons, against 936,639 tons the same period of 1940. It has shipped 1,449,408 tons, compared with 916,990 tons in the same 1940 period. The backlog of orders Sept. 1 was 754,540 tons, all scheduled for fabrication and delivery within the next four months.

SHAPE CONTRACTS PLACED

5000 tons, hangars, lighter-than-air base, Elizabeth City, N. C., to American Bridge Co., Pittsburgh.

2500 tons, buildings 30 and 31, naval dry dock, South Boston, Mass., to American Bridge Co., Pittsburgh; Morton C. Tuttle Co., Boston, contractor and engineer.

1500 tons, power plant and additional facilities, Sperry Gyroscope Co., Hampstead, N. Y., to Lehigh Structural Steel Co., Allentown, Pa. Stone & Webster Engineering Corp., Boston, contractor.

771 tons, plant, Guiberson Diesel Engine Co., Dallas, Tex., to Austin Bros., Dallas, Tex.

515 tons, building, B. T. Babbitt Inc., Albany, N. Y., to American Bridge Co., Pittsburgh; placed direct.

490 tons, three hangars at Greenville, Miss., to Virginia Bridge Co., Roanoke, Va.

400 tons, public school No. 35, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa., through Caristo Construction Co., New York.

380 tons, machine shop extension for Midvale Steel Co., Nicetown, Pa., through Murphy Quigley Co., contractor, to Cantley & Co., Philadelphia.

360 tons, building, Fort Tilden, Long Island, N. Y., to American Bridge Co., Pittsburgh, through United States Engineers, New York.

315 tons, addition to castings plant, Midvale Steel Co., Nicetown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, additions, New Britain Machine Co., Berlin, Conn., to Berlin Construction Co., Berlin, Conn.

265 tons, turbine building, De Laval Steam Turbine Co., Trenton, N. J., to American Bridge Co., Pittsburgh, through John W. Ferguson Co., Paterson, N. J.

260 tons, out-patients building, Lincoln

SHAPE AWARDS COMPARED

	Tons
Week ended Oct. 4	14,786
Week ended Sept. 27	62,861
Week ended Sept. 20	41,332
This week, 1940	36,353
Weekly average, 1941	28,601
Weekly average, 1940	21,326
Weekly average, Sept., 1941	31,253
Total to date, 1940	1,054,027
Total to date, 1941	1,172,646

Includes awards of 100 tons or more.

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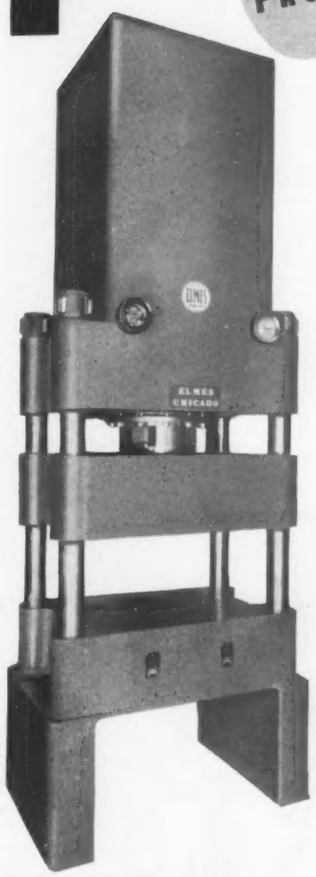

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hospital, New York, to Schact Steel Co., New York, through Lane Engineering Co., New York.

250 tons, bridges in Illinois and Iowa, Chicago Great Western railway, to American Bridge Co., Pittsburgh; bids Sept. 10.

225 tons, building, chemical division, United States Rubber Co., Naugatuck, Conn., to Lehigh Structural Steel Co., Allentown, Pa.; Fletcher & Thompson, Bridgeport, Conn., engineers.

210 tons, state highway bridge, Errol, N. H., to American Bridge Co., Pittsburgh.

200 tons, Pier B. and shed, quartermaster depot, Seattle, to Pacific Car & Foundry Co., Seattle; General Construction Co., Seattle, contractor.

160 tons, racks, navy yard, Brooklyn, N. Y. to Dreier Structural Steel Co., New York; direct bids.

151 tons, two state bridges, Monoma and Plymouth counties, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh; bids Sept. 23.

134 tons, bridge repairs, various locations in Illinois, Wisconsin and Iowa, Chicago, Milwaukee, St. Paul & Pacific railroad, to American Bridge Co., Pittsburg; bids Sept. 4.

100 tons, state highway bridge, Jefferson county, New York, to Phoenix Bridge Co., Pittsburgh, Pa.

100 tons, building addition, Isco Chemical Co., Niagara Falls, N. Y., to Ernst Iron Works, Buffalo; Laur & Mack, Niagara Falls, contractors.

100 tons, addition, Thermoid Co., rubber division, Trenton, N. J. to Keystone Structural Steel Co., Trenton; Fowler & Thorne Co., Trenton, contractor.

100 tons, shapes and reinforcing, addition, Standard Pressed Steel Co., Jenkintown, Pa., to Bethlehem Steel Co., Bethlehem, Pa., and Herbert W. Gerhwind, Jenkintown; Townsend, Shroeder & Wood Inc., Jenkintown, contractor.

Unstated tonnage, addition, Cuno Engineering Corp., Meriden, Conn., to Topper & Griggs, Hartford, Conn.; H. Wales Lines Co., Meriden, contractor; bars to Fox Steel Co.

SHAPE CONTRACTS PENDING

14,000 tons, steel sheet piling, Marine Park, Staten Island, N. Y.

5000 tons, hangar and facilities, lighter-than-air base, South Weymouth, Mass., Harris Structural Steel Co., New York, low.

3000 tons, third section, Venice No. 2 power station, Venice, Ill., Union Electric Co. of Illinois.

2100 tons, condenser tube mill, Phelps-Dodge Copper Products Corp., Los Angeles.

1300 tons, state bridge, Kentucky river, Carrollton, Ky.

1200 tons, Nightingale hospital, New York; bids in.

1200 tons, power house, Kentucky dam, Gilbertsville, Ky., Tennessee Valley authority.

1000 tons, apartment, Ninety-second street and Fifth avenue, New York.

750 tons, radial gates, Ocoee and Apalachia dams, Ducktown and Farmer, Tenn., Tennessee Valley authority.

680 tons, assembly shop and miscellaneous construction, constructing quartermaster, Aberdeen Proving Ground, Md.; bids Oct. 9.

600 tons, bulkhead gates, turbine draft tubes, spec. 989, Odair, Wash., Bureau of Reclamation.

550 tons, ventilation building, MHT-58, New York and New Jersey, Port of New York Authority.

400 tons, manufacturing building, National Can Co., Darby, Pa.

375 tons, boiler house, ordnance works, St. Louis, for government.

350 tons, trusses and beams, Ft. Tilden, Rockaway, N. Y., for army.

320 tons, renewal of gallery floor, buildings B and E, New York Shipbuilding Corp., Camden, N. J.

300 tons, Eastern avenue clover leaf, Middle River, Md., for state.

275 tons, manufacturing building, for Tampax Corp., Flemington, N. J.

270 tons, erecting and paint shop, Whitcomb Locomotive Co., Rochelle, Ill.; revised bids Oct. 2.

240 tons, state bridge in Washington county, Pennsylvania; bids Oct. 3.

230 tons, conveyor structures and chutes, Ohio Power Co., Philo, O.

200 tons, tidal basin bridge, Washington, for District of Columbia.

200 tons, state highway bridge, Steuben, N. Y.; rebid Oct. 8.

175 tons, renewal bridge 5347, Coleman's road, Trenton, N. J., Pennsylvania railroad.

130 tons, bridge over underpass, Ft. Devens, Mass., for army.

120 tons, bridge, specification 1555-D, Cascade, Idaho, Bureau of Reclamation.

100 tons or more, 195 steel lookout towers, 30 and 54 feet high, some with metal cabs; bids Oct. 7, inv. 697, Department of Agriculture, Washington, various deliveries.

Unstated, shapes for substations; bids

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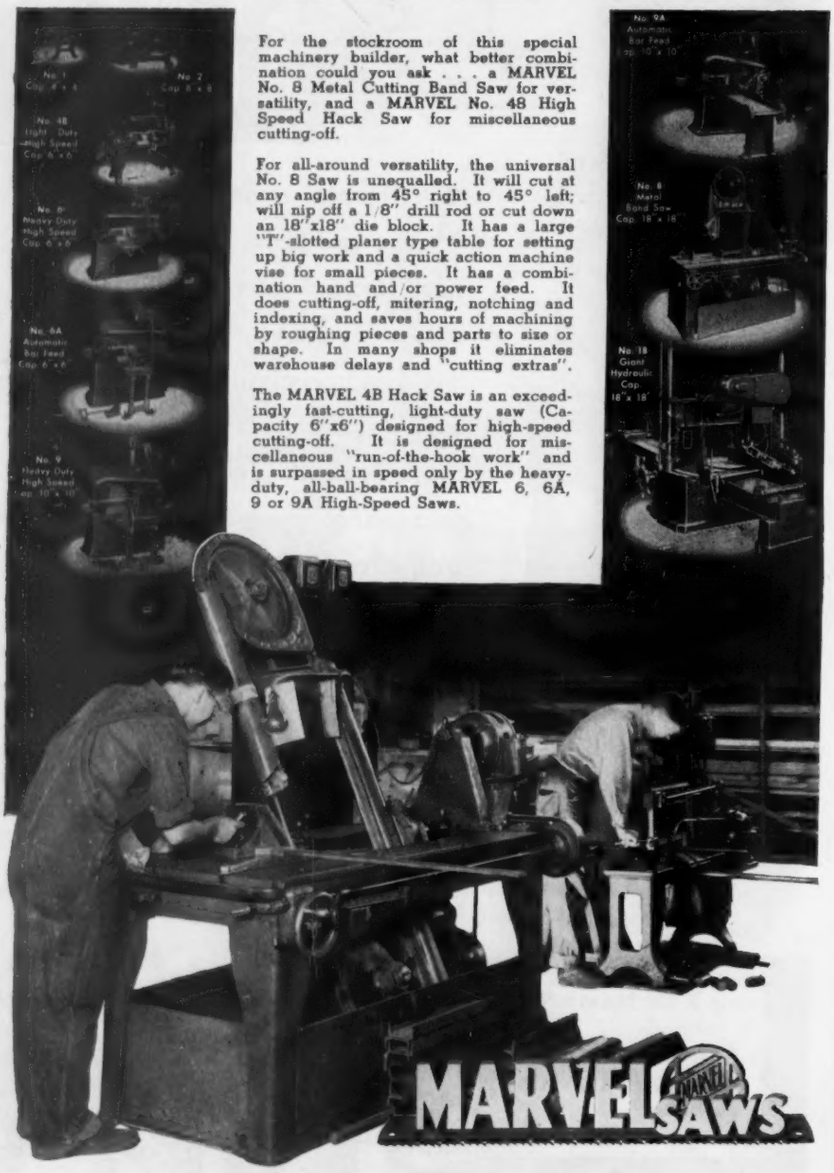


For the stockroom of this special machinery builder, what better combination could you ask . . . a MARVEL No. 8 Metal Cutting Band Saw for versatility, and a MARVEL No. 48 High Speed Hack Saw for miscellaneous cutting-off.

For all-around versatility, the universal No. 8 Saw is unequalled. It will cut at any angle from 45° right to 45° left; will nip off a 1/8" drill rod or cut down an 18"x18" die block. It has a large "T"-slotted planer type table for setting up big work and a quick action machine vise for small pieces. It has a combination hand and/or power feed. It does cutting-off, mitering, notching and indexing, and saves hours of machining by roughing pieces and parts to size or shape. In many shops it eliminates warehouse delays and "cutting extras".

The MARVEL 4B Hack Saw is an exceedingly fast-cutting, light-duty saw (Capacity 6"x6") designed for high-speed cutting-off. It is designed for miscellaneous "run-of-the-hook work" and is surpassed in speed only by the heavy-duty, all-ball-bearing MARVEL 6, 6A, 9 or 9A High-Speed Saws.

ARMSTRONG-BLUM MFG. COMPANY

5700 Bloomingdale Ave. *"The Hack Saw People"* **Chicago, U.S.A.**

Eastern Warehouse & Sales: 225 Lafayette St., New York

to Bonneville Power Adm., Portland, Oreg., Oct. 6.

Unstated, transformer tie-down portal frames, Coulee power plant, Gate City Iron Works, Omaha, low to Denver.

Unstated, Payette river bridge relocation, Idaho Northern railway, near Cascade, Idaho; bids to Denver Oct. 8; spec. 1555-D.

Reinforcing Bars

Reinforcing Bar Prices, Page 97

Reinforcing bar producers have fairly large backlogs but bookings can be made in the A priority group. B ratings are not being considered by most producers. Re-rolled bar makers have difficulty in obtaining raw material and are running light.

Considerable prospective business is under consideration but is slow in closing, due to difficulty in obtaining priorities. Bidding dates are being extended in many cases because contractors are unable to obtain estimates from suppliers on which to base their bids.

Army and navy needs for the next year are being outlined and promise steady demand for reinforcing material. New defense plants continue to require large tonnage and a number of projects are approaching the bidding stage.

REINFORCING STEEL AWARDS

3200 tons, borough of Queens sewer project, to Bethlehem Steel Co., Bethlehem, Pa.; Andrew Catapana, contractor.

2800 tons, Pier B. and shed, quartermaster depot, Seattle, to Bethlehem Steel Co., Seattle; General Construction Co., Seattle, contractor.

1500 tons, dry docks, Curacoa, Dutch West Indies, to Bethlehem Steel Co., Bethlehem, Pa., through Raymond Concrete Pile Co.

900 tons, ammonium nitrate plant, Baxter Springs, Mo., to Sheffield Steel Corp., Kansas City, Mo.; Freeto Construction Co. and F. H. McGraw, contractors.

800 tons, Peavy Falls dam, Sagola, Mich., to Cook & Brown, Oshkosh, Wis.; C. R. Meyer & Sons, Oshkosh, Wis., contractor.

800 tons, transformer deck, Coulee power house; Consolidated Builders Inc., contractor; materials furnished by Reclamation Bureau.

800 tons, Bellevue naval magazine storehouse, Washington, to Bethlehem Steel Co., Bethlehem, Pa., through Hudson Supply & Equipment Co.; Harwood-Hobel Co., contractor.

500 tons, army air bases in Alaska, to Northwest Steel Rolling Mills, Seattle.

500 tons, approximate, building, Eastman Kodak Co., Rochester, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; A. W. Hopeman & Sons Co., Rochester, contractor.

375 tons, flood protection, section 2, Corning, N. Y., to Bethlehem Steel Co., Bethlehem, Pa. H. F. McLean, contractor.

327 tons, Texas state highway department, Gonzales County, with piling and bridge railing, to North Texas Iron & Steel Co., Fort Worth, Tex.

310 tons, boiler plant, naval training station, Newport, R. I., to Bethlehem Steel Co., Bethlehem, Pa.

260 tons, Champion Machine & Forging Co., Cleveland, to Republic Steel Corp., through Patterson-Leitch Co.; Sam W. Emerson Co., contractor.

250 tons, packing plant, Morrell & Co., Sioux Falls, S. Dak., to Hassenstein Steel Co., Rapid City, S. Dak.

237 tons, housing project, Quincy, Ill., for government, to Ceco Steel Products Corp., Chicago; T. S. Willis, Janesville, Wis., contractor; bids Sept. 5. Project originally bid May 22 and bids thrown out.

200 tons, pumping station and dikes, Lowell, Mass., to Jones & Laughlin Steel Corp., Pittsburgh J. L. Washbourne, contractor.

152 tons, Texas state highway department, Franklin county, with piling and bridge railing, to North Texas Iron & Steel Co., Fort Worth, Tex.

140 tons, including 73 tons bars and balance wire mesh, state paving R-2194, Lafayette, Ind., to Bethlehem Steel Co., Bethlehem, Pa.; Calumet Paving Co., Indianapolis, contractor.

Unstated, wire mesh, army air base, Seward, Alaska, to Charles R. Watts, Seattle.

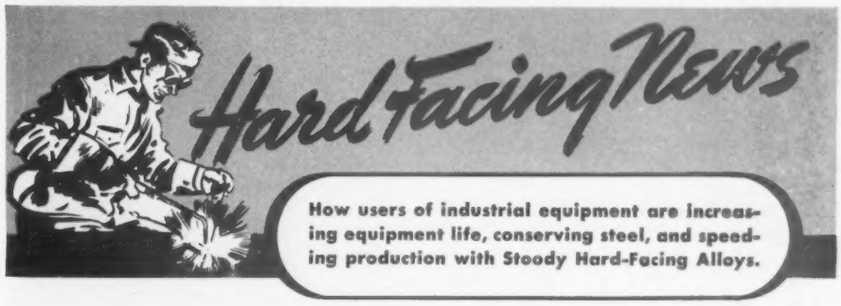
Unstated tonnage, addition, Milford Rivet & Machine Co., Milford, Conn., shapes to Leake & Nelson, Bridgeport, Conn.; reinforcing to Charles Tregger, Bridgeport; Leo F. Caproni, New Haven, engineer and architect.

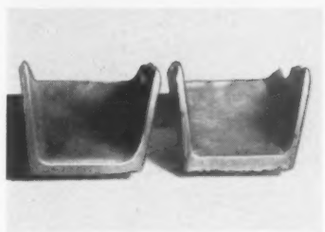
Unstated tonnage, defense housing proj-

CONCRETE BARS COMPARED

	Tons
Week ended Oct. 4	14,051
Week ended Sept. 27	49,269
Week ended Sept. 20	21,105
This week, 1940	18,191
Weekly average, 1941	14,529
Weekly average, 1940	8,814
Weekly average, Sept., 1941	34,025
Total to date, 1940	384,133
Total to date, 1941	595,670

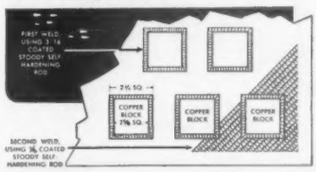
Includes awards of 100 tons or more.


Hard Facing News
How users of industrial equipment are increasing equipment life, conserving steel, and speeding production with Stoody Hard-Facing Alloys.



SAND SLINGER CUPS—The continuous replacement of sand slinger cups is a costly problem to foundry men—but it has been overcome by coating the wearing surfaces with Stoodite "63." This metal, next to carbides in hardness, forms a smooth, flawless deposit that reduces wear to a minimum.

Below: **SIZING SCREENS**—Screens, used for sizing steel mill slag, normally last but a short time because the hard, sharp slag particles cut into the high carbon steel, enlarging the openings. Hard-facing screens with Coated Stoody Self-Hardening (see sketch) increases screen life as much as eight times.


FIRST WELD USING 3/16 COATED STOODY SELF HARDENING ROD
2½ SQ.
COPPER BLOCK 2½ SQ.
COPPER BLOCK
COPPER BLOCK
SECOND WELD USING 3/16 COATED STOODY SELF HARDENING ROD

BLAST HOLE BITS—Tube Borium, long a favorite in the oil fields, is also widely used for hard-facing the cutting and reaming edges of rotary blast hole drilling bits. Tube Borium, because of its extreme hardness, not only increases cutting efficiency but also keeps bits "out-to-gauge."

Stoody hard-facing metals are being profitably used on the wearing surfaces of all types of industrial equipment. If abrasion is your problem Stoody engineers will gladly show you how and where to apply one of the Stoody Hard-Facing Alloys to get maximum service from your equipment. Prices and characteristics of Stoody Hard-Facing Alloys are explained in the Stoody Catalog No. 106—Send for your copy now!

STOODY COMPANY, 1134 WEST SLAUSON AVE., WHITTIER, CALIFORNIA

STOODY CATALOG NO 106 STOODY COMPANY WHITTIER CALIFORNIA

Free!

STOODY COMPANY Hard Facing Alloys

ect, South Charleston, W. Va., to West Virginia Rail Co., Huntington, W. Va.; Engstrom Wynn, Wheeling, W. Va., contractor.

REINFORCING STEEL PENDING

2000 tons, Texarkana, Ark., Lone Star ordnance plant, Winston Bros. and Haglin & Son, Minneapolis; Sollit Construction Co., Chicago, and Missouri Valley Bridge & Iron Co., Leavenworth, Kan., general contractors.

1500 tons, sewer connection, Navy yard, Brooklyn, N. Y.

800 tons, penstocks, Fort Peck, Mont.

750 tons, bars and mesh, Connecticut highways; bids Oct. 6.

700 tons, superstructure plant No. 2, General Motors Corp. Frigidaire division, Moraine, O.

600 tons, maintenance command building, Patterson Field, O.

600 tons, four buildings, Rath Packing Co., Waterloo, Iowa; bids postponed to Oct. 9.

400 tons, foundry, pattern shop and other construction, Keyport torpedo station, Washington state; J. W. Bailey Construction Co., Seattle, low, $315,500.

300 tons, office building, Standard Oil Co., Des Moines, Iowa.

200 tons, foundations, Chelsea housing project, New York.

200 tons, municipal storm sewers, Alexandria, Va.

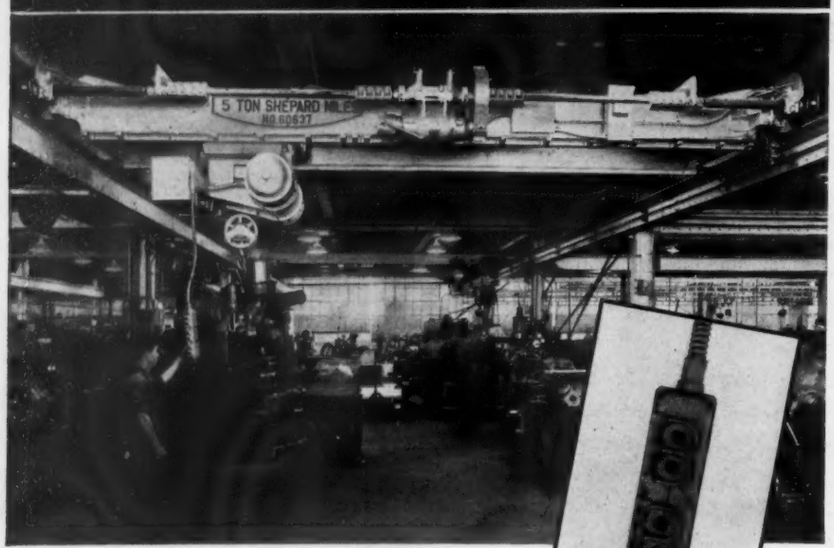
179 tons, state hospital for insane, Manitowoc, Wis., Hunzinger Construction Co., Milwaukee, low; bids Sept. 6 higher than estimate; project abandoned.

165 tons, constructing quartermaster, Aberdeen Proving Ground, Md.; bids Oct. 9.

100 tons, addition, St. Luke's hospital, Cleveland.

100 tons, housing project, Rockford, Ill.; bids Oct. 6.

OVERHEAD
Electric Traveling Cranes
CAPACITIES 1 TO 450 TONS



Selective 5-Speed Push Button Control applied to a Shepard Niles Inner-Running Trolley Crane.

Shepard Niles Selective 5-Speed Master Switch.

● Up under the ceiling there is always a clear right of way for moving loads. Floor space is saved—aisles are never blocked—and materials move faster, move most economically on the crane or hoist precisely suited to the job.

Shepard Niles offers Electric Cranes of practically every type for lifting and moving loads up to 450 tons and Electric Hoists of more than 5000 standard types and sizes.

A COMPLETE LINE OF CRANES & HOISTS

SHEPARD NILES CRANE & HOIST CORP.

358 SCHUYLER AVENUE... MONTOUR FALLS, N. Y.

Pig Iron

Pig Iron Prices, Page 98

October allocations of pig iron by OPM did not specify as large tonnage as requested by some melters but with few exceptions consumers appear to be provided a reasonable supply where actually needed. Some buyers were cut off entirely because of sufficient supply on hand. Some producers indicate they will be able to supply all customers with defense ratings and believe they will be able to supply some tonnage for nondefense users where it appears they need iron to continue operation. It seems the broad policy under the pig iron regulation is influenced considerably by actual needs, regardless of the extent of defense work. The disposition seems to be to give all melters as much chance as possible to keep organizations intact while seeking to obtain defense work.

September closed with some leading consumers failing to receive all the iron allocated to them. Some of this now is in process of being shipped and it is generally assumed this will not be charged against October quotas.

Bethlehem Steel Co. and Davies & Thomas Co., Catasauqua, Pa., will supply approximately 40,000 tons of cast iron tunnel rings for the Battery-Brooklyn tunnel, New York. Deliveries are to start late in the first quarter of 1942. The project has been given an A-2 priority rating which would appear to cover a large tonnage of pig iron required for casting the rings.

One of the largest individual inquiries for foundry pig iron is up for the navy, 5500 tons closing Oct. 16 under schedule 8820, for delivery to various east and west yards.

Scrap

Scrap Prices, Page 100

Steel scrap is increasingly scarce and while some betterment in supply may result from the recent ruling on remote scrap this is not expected to yield sufficient to meet current requirements. Expectation is growing that some form of priority or allocation will be imposed by Washington in the effort to pro-

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten types

For each 1% tungsten contained	
Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 0.50 vanadium	13.50
Turnings, millings, same basis	11.50

vide material for most pressing needs.

In all important consuming centers it is becoming increasingly evident that curtailment of steelmaking is inevitable under present conditions, when reserves have been exhausted. Current production rate is such that inventory is being reduced steadily, incoming scrap being much less than requirements. Already some open hearths have been taken off, ostensibly for repair but in reality because scrap is insufficient.

Rejections because of overgrading are becoming more common as steel mills adhere to the program of following the ceiling price ruling. Usually the rejected cars are reshipped instead of being accepted at the price of the lower grade. This has had the effect in the Pittsburgh district of uneven mill supply.

Total of scrap moving at present is less than a month ago. There is a tendency for dealers to accumulate stock in the hope of better prices, but it is not believed the total held back for this reason is large.

It appears that a great deal of remote scrap available a month or more ago was cleaned up while ceiling prices were not being observed and immediate response from the recently announced higher allowances will not be large.

Four open hearths scheduled to be taken off late last week by Great Lakes Steel Corp., Detroit, were continued in production but may be dropped at any time because of scrap shortage. Some relief from the scrap situation will result from enlargement of a Hanna blast furnace at Zug Island from 550 to 1100 tons per day, which will increase hot metal supply to open hearths.

As has been the case for some time foundries are unable to obtain cast grades in sufficient quantities. Short rails for cupola melting are especially scarce and dealers state they cannot obtain rails in competition with rerollers. Low phos prices are also considered too low to give a profit for handling in competition with heavy melting steel.

Baltimore & Ohio closes today on a list of 9255 tons, including 450 tons of cast scrap and 2200 tons of heavy melting steel. The Nickel Plate also has a list to close today.

Universal Smelting & Refining Co. is being formed at Buffalo by Walter F. Lockwood, president of Universal Research Corp., to build a plant for reduction of entire autobiles into scrap and pig iron.

Warehouse

Warehouse Prices, Page 99

Orders by warehouses were lighter in September in view of transition to the OPM allocation plan, which is going into effect this month. An increase is expected under this plan. Position of these distributors is expected to be improved although heavy orders with higher priorities may interfere with mill shipments.

Warehouses may file a single PD-73 form to cover all orders in a single group classification placed with a producer during a calendar month, the form to be in by the fifth of the following month.

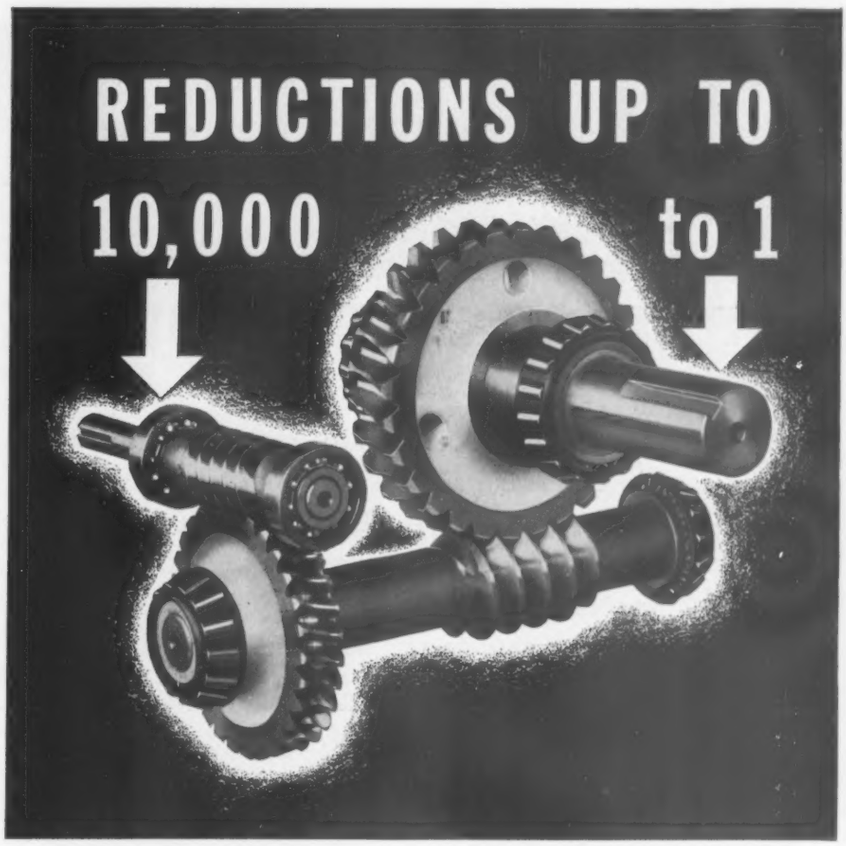
Many inquiries to warehouses can not be filled because of lack of needed sizes and analyses and substitutes are being worked out to fill the needs. Inventory of steel in stock continues to dwindle.

Pacific Coast

Seattle—Pressure continues unabated on rolling mills and fabricating shops, struggling under large backlogs, which show little reduction. Practically all capacity is being used by defense projects. Increased lettings are reported by sub-contracting plants.

Jobbing houses anticipate relief when the effect of new priority regulations reaches the Pacific but this will take time. Meanwhile stocks are seriously depleted and replacements are difficult and slow. All out of stock items are in strong demand, plates especially, of which practically none are left in warehouses.

The scrap market is unchanged. Dealers are disappointed that the price ceiling in this area has not been raised, as was done in other sections. While rolling mills still



HORSBURGH & SCOTT Worm Gear Speed Reducers are available in ratios from 3⅝ up to 10,000 . . . a most complete line of eight different types. These reducers are noted for their long life records of service and here's why . . . Simple in design . . . Heavy, wide face gears—accurately cut . . . Anti-friction bearings . . . Heavy, dust-tight housings . . . Oversize shafts and bearings . . . Efficient lubrication.

Send note on Company Letterhead for Speed Reducer Catalog 39

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

have material on hand the outlook is not promising unless prices are raised. Cast scrap is increasingly scarce and foundries are hard pressed to meet operating needs. State officials are conducting a survey to uncover potential metal scrap supplies.

General Construction Co., Seattle, awarded a $1,944,000 contract for Pier B and warehouse, Seattle quartermaster depot, has placed 2800 tons of reinforcing bars with Bethlehem Steel Co. and 200 tons of shapes and bolts with Pacific Car Foundry Co., Seattle.

Cast iron pipe agencies are busy figuring proposed projects but difficulty of obtaining prompt deliveries is holding back definite specifications.

An important project is furnishing of seven 60,000 kva transformers for Bonneville powerhouse, bids to U. S. engineer, Portland, Oct. 14, No. 698-42-201.

The government has increased to $15,943,480 the amount to be expended for the new Boeing Aircraft Co.'s seaplane plant at Renton, Wash., construction of which has started under the Austin Co., contractors. Of the above amount $11,546,000 will be spent for land and buildings and $4,397,480 for equipment.

GLOBE

SUPERIOR LADLE BRICK

Recent additions to our plant have increased our annual capacity of "GLOBE" Superior Ladle Brick to 42,000,000 brick per year . . . to meet the demand made necessary because of years of fully satisfactory service to the steel industry.

"GLOBE" Superior Ladle Brick, either wire cut or dry pressed, will improve your metal . . . eliminate dirty steel . . . reduce lost time due to refractory replacement . . . and lower per ton brick costs.

Whether you need a few hundred or several thousand ladle brick, we can supply your requirements immediately.

May we have an opportunity to quote on your next order?

SERVING THE STEEL INDUSTRY SINCE 1873

The GLOBE Brick Co.

EAST LIVERPOOL, OHIO

Canada

Toronto, Ont.—The steel controller has ordered steel producers and jobbers to keep his department informed on all new orders and backlogs as of Oct. 1. The order deals particularly with all classes of rolling mill products. At the same time orders for heavy steel, and practically all steel materials, with the exception of wire mill products, must be approved by him before delivery can be made. This tightening of supervision of orders to mills and jobbers does not affect production schedules, but does curb shipments to civilian consumers. There is no falling off in demand for finished and semifinished steel and mills are jammed with orders. Current bookings are almost entirely for 1942 delivery.

Blowing in of the new blast furnace by Steel Co. of Canada Ltd., Hamilton, will, it is understood, have direct bearing on the company's production of plates. To date the plate mill has been producing at about two-thirds capacity, but with the increased supply of pig iron and consequent advance in steel ingot output the company expects to bring its plate mill to capacity. The capacity is approximately 180,000 tons per annum. Demand for plates is increasing rapidly and there is substantial unfilled tonnage.

Orders for sheets are heavy but the only ones accepted are these directly associated with war work and approved by the steel controler.

No improvement is reported in merchant bars. Mills are operating fully, with heavy backlogs.

Department of munitions and supply, in connection with war construction projects, is placing heavy orders for structural shapes and substantial tonnages are pending in connection with undertakings now in preliminary stages. Included in orders by the department last week were 1600 tons to Dominion Bridge Co., Lachine, Que., and 1000 tons to Central Bridge Co. Ltd., Trenton, Ont. Lettings for private construction work have practically disappeared, although individual companies undertaking plant expansions for war work are maintaining demand.

Demand for merchant pig iron is well in excess of supply. However, melters hope that production of foundry and malleable grades will be stepped up, following lighting of the new furnace at Hamilton, Ont.

Iron and steel scrap inquiries are heavy, especialy for cast grades. Local sources of supply are maintaining good flow of steel scrap to dealers, while offerings of cast and stove plate are small.

Iron Ore

Iron Ore Prices, Page 99

Shipments of Lake Superior iron ore in September set a new record for that month at 10,311,517 gross tons, compared with the former record of 9,998,618 tons in the corresponding month last year, an in-

crease of 312,889 tons. This compares with the alltime monthly record of 11,496,303 tons in August.

Season total to Oct. 1 was 62,024,228 tons, compared with 48,235,227 tons to Oct. 1, 1940. The aggregate to Oct. 1 this year is close to the alltime record for an entire year, 65,204,600 tons, made in 1929.

Shipments in gross tons for September were:

	September, 1941	September, 1940
Escanaba	583,711	599,667
Marquette	614,271	758,213
Ashland	582,596	911,218
Superior	3,791,412	3,339,743
Duluth	2,558,205	2,737,797
Two Harbors	2,112,688	1,588,008
U. S. ports	10,242,883	9,934,646
Michipicoten	68,634	63,972
Grand total	10,311,517	9,998,618
Increase over year ago	312,899	.....

Cumulative shipments for the season to Oct. 1 were:

	To Oct. 1, 1941	To Oct. 1, 1940
Escanaba	3,590,277	2,550,367
Marquette	4,328,656	4,100,204
Ashland	5,045,660	4,452,194
Superior	21,972,413	16,919,361
Duluth	15,415,417	11,812,917
Two Harbors	11,308,527	8,159,050
U. S. ports	61,660,950	47,994,093
Michipicoten	363,278	241,134
Grand total	62,024,228	48,235,227
Increase from year ago	13,789,001	.....

New Extras on Alloy Steels Are Issued

Carnegie-Illinois Steel Corp. has issued a new list of extras covering alloy steels, effective Oct. 1, superseding the list dated Sept. 1, 1940, and prior issues.

Products covered include open-hearth and electric furnace steel bars, bar-strip, billets, blooms and slabs. The entire format of the alloy content tables has been changed, inasmuch as this list eliminates the former standard practice manual and is based on the standard practice as defined in Steel Products Manual, Section 10, as issued by the American Iron and Steel Institute.

In addition to the alloy content extras, special quality extras have been completely revised. Some changes have been made in cutting extras on bars and bar-strip, and new extras for chamfering these products, for automatic screw machine use, have been set up. Changes in wording of various minor extras have also been included, but no change has been made in the charge. A table of extras for stamping heat numbers or symbols on individual bars has also been inserted.

Steel in Europe

Foreign Steel Prices, Page 99

London — (*By Cable*) — Contracts for fourth quarter delivery of steel in Great Britain insure large scale operations of steelmakers. The steel industry is now well specialized for war production, allowing prompter deliveries and greater reliance on domestic production, thus reducing necessity for imports from America. Tonnage for civilian needs and nonessential exports is increasingly shrinking. Stocks of pig iron and semifinished steel are being built up for an emergency reserve.

Equipment

Boston—Large orders for machine tools in connection with expanding facilities for aircraft engine production are being placed and estimated. New England shops have additional contracts for grinding machines, tooling of a Pottstown, Pa. engine plant being an important factor. Considerable business is to be placed by other engine builders. Most of this volume is being distributed through Wright Field, Dayton, O.

An outstanding order for grinding machines is one to Brown & Sharpe Mfg. Co., Providence, R. I., $719,325 placed by the ordnance department. While demand for grinding equipment is heavy, other types are active, including screw machines, and varied units with

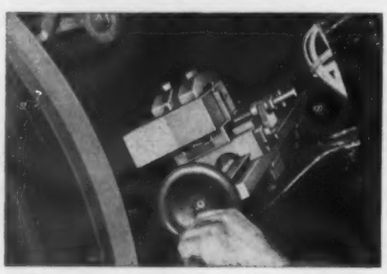
Flame Hardening...
A routine job for 10 years at NE
. . . Flame hardening of specialized gearing and castings has been routine at National-Erie Corp. for 10 years. You will profit by investigating National-Erie's capacity to meet your specifications for Flame Hardened Steel Castings, under one control from raw material to finished product.
NELOY and NELOY-Molybdenum Steels were developed in the National-Erie Metallurgical Laboratory to be readily adapted for Heat Treating by the Flame Hardening process. Their improved qualities over carbon steel improve the machining performance.
NATIONAL-ERIE
CORPORATION
ERIE, PA., U.S.A.

KEEP MOTORS RUNNING IN Peak Condition

IDEAL RESURFACERS

Prevent trouble! Use IDEAL Resurfacers periodically to keep Commutators and Slip Rings at peak efficiency; or to restore surfaces which are scored, ridged or burned. No dismantling; no lost time. Many grades, sizes and shapes to meet all motor conditions.

IDEAL PRECISION GRINDERS



When Commutator and Slip Ring surfaces become rough, you can true them up right in their own bearings, operating at normal speed. No time wasted dismantling. IDEAL grinder mounts on frame or brush arms. Grinds to accuracy of .001 inch. 3 Models to meet all conditions.

WRITE FOR CATALOG
Complete Motor Maintenance Line

IDEAL COMMUTATOR DRESSER CO.
5076 Park Ave. Sycamore, Illinois
In Canada:
Irving Smith, Ltd. Montreal, Quebec

sub-contractors for defense placing more orders.

Substantial purchases for the new Sperry Gyroscope Co. plant, Hempstead, N. Y., are being made in New England; also by sub-contractors making parts for that company. Re-shuffling of delivery schedules as to defense importance under direction of OPM continues, some tools being delivered ahead of promise at the expense of others, including original buyers.

Seattle — Defense requirements are taking practically the capacity of this field with a strong demand from state and county units for automotive and road equipment and electrical items receiving secondary consideration. Denver has called bids Oct. 20, Spec. 994, for 12 circuit breakers, 21 disconnecting switches and two lightning arresters for Units 1 to 6, Coulee power plant. United States engineer, Portland, Oreg., has called bids Oct. 14 for seven 60,000-kva. transformers for Bonneville powerhouse, Spec. 698-42-201, also Oct. 9 for distributing centers same project. Star Machinery Co., Seattle, has an army award to furnish shop equipment for inshore patrol bases, 14 of which are planned for Oregon, Washington and Alaska. Southern States Equipment Corp., Birmingham, Ala., is low for furnishing bus insulators. Tacoma has called bids Oct. 13 for six circuit breakers, 15 to 110 kva.

Farm Equipment Institute Discusses Defense Problem

CHICAGO

■ Problems facing farm machinery manufacturers in national defense were discussed at the Forty-eighth annual convention of the Farm Equipment Institute here last week. Nearly 600 attended.

Speakers geared their remarks to materials shortages, priorities and future outlook. Although lacking high priority ratings for their own products, the industry is producing war material in important volume. Thirty-seven per cent of the defense contracts placed through the Chicago ordnance office have been awarded to farm equipment makers.

W. H. Roberts Jr., secretary, sales manager, S. L. Allen & Co., Philadelphia, was elected president. F. H. Clausen, president, Van Brunt Mfg. Co., Horicon, Wis., was re-elected first president. Frank Silloway, vice president, Deere & Co., Moline, was named chairman of the executive committee. Theodore Johnson, secretary, J. I. Case Co., Racine, is a new director. Re-elected directors are W. D. James, president, James Mfg. Co., Fort Atkinson, Wis.; C. B. Schmidt, general manager, De Laval Separator Co., Chicago; H. S. Lord, vice president, French & Hecht Inc., Davenport, Iowa, and W. A. Roberts, manager, tractor department, Allis-Chalmers Mfg. Co., Milwaukee.

MAKE HIS WORK LESS *BORING*

Photo—Warner & Swasey

. . . by furnishing him with BISCO Alloy and Tool Steel Tubing that meets your exacting requirements for such items as ring dies, bushings, forming rolls, etc. With the right combinations of inside and outside diameters stocked for immediate shipment, long, costly hours of lathe work on solid rounds are no longer necessary.

Let us mail you our current stock and price list on BISCO Alloy and Tool Steel Tubing.

THE BISSETT STEEL CO.
900 EAST 67th STREET, CLEVELAND, OHIO

Nonferrous Metal Prices

Sept.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
2-26	12.00	12.12½	11.75	52.00	52.00	5.85	5.70	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.10
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices

No. 1 Composition Red Brass

New York	10.00-10.25
Cleveland	10.00-10.25
Chicago	9.25-9.50
St. Louis	9.50

Heavy Copper and Wire

New York, No. 1	10.00
Cleveland, No. 1	10.00
Chicago, No. 1	10.00
St. Louis	10.00

Composition Brass Turnings

New York	9.25

Light Copper

New York	8.00
Cleveland	8.00
Chicago	8.00
St. Louis	8.00

Light Brass

Cleveland	5.50-5.75
Chicago	5.75-6.00
St. Louis	5.75-6.00

Lead

New York	5.00-5.25
Cleveland	4.75-5.00
Chicago	4.75-5.00
St. Louis	4.50-4.75

Old Zinc

New York	4.50
Cleveland	4.00-4.12½
St. Louis	4.50-5.00

Aluminum

Mis., cast	11.00
Borings, No. 12	9.50
Other than No. 12	10.00
Clips, pure	13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l.	13.25
Standard No. 12 aluminum	16.00

Nonferrous Metals

New York—Several important orders were issued last week governing prices on and distribution of metals. Order M-38 was issued which placed all lead supplies under full priority control. OPA amended price schedule No. 12, establishing maximum prices on additional grades of brass mill scrap and announced that an official order would be issued during October which will reduce as of Nov. 1 maximum prices on aluminum scrap and secondary aluminum. The reduction will average about two cents a pound in order to bring these prices in line with the primary aluminum ingot prices which were lowered two cents a pound as of Oct. 1.

Copper—Output is to be increased 60,000 tons per year at the Phelps Dodge Corp.'s properties in Arizona at a cost of $28,000,000 to the RFC subsidiary, Defense Plant Corp. This is a means of subsidizing copper production.

Lead—Under the M-38 order refiners and dealers in lead must file with the division of priorities each month a schedule of proposed shipments for the following months; after Oct. 1 each refiner is required to set aside a certain quantity of production for the formation of an emergency pool; in shipping the remainder of his production not covered by pool requirements, refiners must give preference to defense orders; all lead released by Metals Reserve Co. is to be allocated by the director of priorities.

Zinc—Supply situation has remained almost constant for three months. A large share of demand is being met by the 55,000 tons which producers independently ship to their consumers and by the 20.400 tons which are allocated by OPM.

Tin—Offerings continued light here as prices in Singapore remained high, or at the equivalent of about 52.50c compared with the maximum price of 52.00c established by OPA. U. S. government as well as large consumers have substantial reserves.

Shaped Wire, Welding Electrodes and General Wire

In this period of emergency, when National Defense takes precedence, many find it possible to use new production standards on new or substitute materials.

We know from experience that many users of shaped wire have been able to adapt standard production shapes to replace shapes that require special mill runs.

The shapes shown above suggest a few of the many which are standard that PAGE turns out—widths up to ⅜" and end section areas to approximately .250 square inches.

PAGE HI-TENSILE "F"
High speed welding, a shield-arc type electrode for vertical, horizontal or overhead.

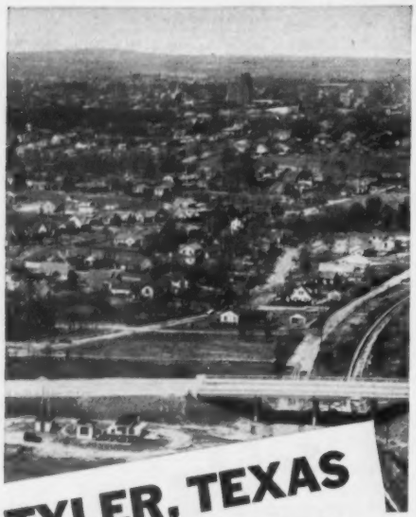
PAGE HI-TENSILE "C"
A shield-arc type electrode for maximum strength, penetration and uniformity—vertical, horizontal or overhead welding.

PAGE-ALLEGHENY STAINLESS
Shield-arc type electrodes from which you can select one that will give you weld metal in welds that equals the stainless you weld.

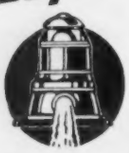
PAGE STEEL AND WIRE DIVISION
MONESSEN, PENNSYLVANIA

In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.



TYLER, TEXAS
City and Industry—100% Layne



NUMEROUS are the cities and towns where municipal and industrial water wells and pumps are 100% Layne. The progressive and thriving city of Tyler, Texas, is an example. The first ground water development in that area was installed by Layne in 1934. Since then all municipal and industrial well water supply and turbine pump systems have been Layne.

In meeting defense and armament project emergencies, Layne Companies have broken all records, both in the number of wells and pumps installed and in the quantity of water produced, in any like period of time. In addition to such added activity, Layne Companies have continued their service to municipal and industrial non-defense projects without appreciable delay.

Layne is unquestionably the largest and most widely experienced ground water developing organization in the Nation. Their methods have proven most successful and the number of their completed projects exceeds that of any other organization ten times and more.

Layne has the men, machinery and experience necessary to handle water development contracts of any size. Their Engineers are ready to cooperate on your plans. If you need more water, write or wire.

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE
PUMPS & WELL WATER SYSTEMS

AFFILIATED COMPANIES

Layne-Arkansas Co.	Stuttgart, Ark.
Layne-Atlantic Co.	Norfolk, Va.
Layne-Bowler New England Corp.	Boston, Mass.
Layne-Central Co.	Memphis, Tenn.
Layne-Northern Co.	Mishawaka, Ind.
Layne-Louisiana Co.	Lake Charles, La.
Layne-New York Co.	New Cork City.
Layne-Northwest Co.	Milwaukee, Wis.
Layne-Ohio Co.	Columbus, Ohio.
Layne-Texas Co.	Houston, Texas.
Layne-Western Co.	Kansas City, Mo.
Layne-Western Co. of Minnesota	Minneapolis, Minn.
International Water Supply	London, Ontario, Can.

DIED:

Henry Buker, 67, vice president, Brown & Sharpe Mfg. Co., Providence, R. I., Sept. 29. Joining Brown & Sharpe in 1892, Mr. Buker subsequently served as assistant secretary and sales manager and in 1924 became vice president.

♦

Col. James B. Dillard, 59, general superintendent, Cleveland Twist Drill Co., Cleveland, and an authority on ordnance engineering, at Winton Place, Va., Sept. 28.

♦

Frederick W. Werner, 52, assistant to the president and in charge of coke by-product sales, Steel Corp. of Delaware, wholly owned subsidiary of United States Steel Corp., New York, at Flushing, Long Island, Sept. 30.

♦

J. Clinton Davis, 64, consulting engineer and partner in J. B. Davis & Sons, civil engineers, Cleveland, at his home in that city, Oct. 2.

♦

Henry S. Snyder, 72, retired executive vice president in charge of finances, Bethlehem Steel Co., Bethlehem, Pa., at his home near that city, Oct. 1. Mr. Snyder, who retired in 1925, was a member, American Iron and Steel Institute and American Institute of Mining and Metallurgical Engineers.

♦

John Dillon, 71, vice president, Keokuk Electro-Metals Co., Keokuk, Iowa, at his home in that city, Sept. 26.

♦

Henry W. Raymond, 72, retired manufacturer, Sept. 28, at his home in Rutherford, N. J. One of the founders, in 1894, of Worthington & Raymond, fabricators of tools and supplies, Mr. Raymond retired as president in 1928.

♦

William L. Emmet, 82, retired consulting engineer, General Electric Co., Schenectady, N. Y., in Erie, Pa., Sept. 26. Mr. Emmet, who held 122 patents, invented a mercury vapor power boiler process and developed a method of turboelectric propulsion for ships.

♦

Frank J. Barnhardt, 52, owner, Barnhardt Sheet Metal Works, Cudahy, Wis., Sept. 28.

♦

Edgar E. Salsbury, 79, for many years a signal engineer, Gamewell Fire & Police Alarm Co., Chicago, in Milwaukee, Sept. 28.

♦

George H. Crosby, 92, retired railroad executive, at his home in Chicago, Sept. 29.

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A genuine interest in your comfort by everyone from manager to doorman.

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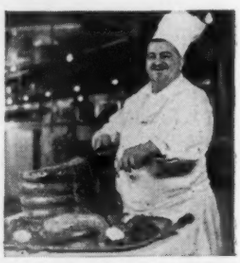

Deep beds, crisp linen, modern furnishings planned for comfort.

Gay music for dancing, or calm quiet if you prefer.

Convenience that saves time and money. Hotel Cleveland adjoins the Union Terminal and Terminal Garage, and is next door to everything you'll want to see in Cleveland.

HOTEL CLEVELAND *Cleveland*

Amend Brass Mill Scrap Price Schedule

■ Several minor changes in Price Schedule No. 12, covering brass mill scrap, have been issued by Leon Henderson, OPA administrator.

1—Addition of a new category designated as "copper" with the following maximum prices for less than 15,000 pound lots: Heavy scrap, 10¼ cents per pound; rod ends, 10¼ cents per pound; and rod turnings, 9½ cents per pound. Premium of ⅝-cent per pound may be paid on shipments of 15,000 pounds or more at one time and of 1 cent on shipments of 40,000 pounds or more. This type of material is currently covered in price schedule No. 20 on "copper scrap" but is to be removed from that schedule shortly.

2—Addition of a new category designated as "nickel silver" with the following maximum prices for less than 15,000 pound lots:

Nickel Silver	Heavy Scrap	Rod Ends	Turnings
5% nickel	9¼c	9c	4⅝c
10% nickel	10⅛c	9⅞c	5 1/16c
15% nickel	10⅞c	10⅝c	5 7/16c

Nickel silver scrap was formerly covered by Price Schedule No. 8 on "nickel scrap." The change was made because most nickel silver is produced by brass mills. Cupronickel remains in the nickel scrap schedule.

3—The definition of "brass mill scrap" has been changed so as to conform substantially with the OPM priority order covering copper and copper alloy scrap.

4—The enforcement section has been modified so as to take account of possible co-operation by state, county and local governments in seeking enforcement through revocation of license and permits. This section also states "that the procurement services of the government are requested to refrain from selling to or purchasing from those persons who fail to comply."

Copper Scrap Placed Under Full Priority Control

■ Copper scrap has been placed under full priority control by the OPM Priorities Division, through Supplementary Order M-9-b. Copper has been under rigid allocation control since M-9-a was issued Aug. 2 and the new order completes control over this basic scarce metal, second only to aluminum as the most difcult to obtain in sufficient quantities for defense and civilian needs.

One section of M-9-b requires that all brass mill scrap be directed back to brass mills, either directly, or through dealers who are not permitted to make deliveries to any

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Hannifin Air Control Valves are made in 3-way and 4-way types, hand and foot operated, manifold, spring return, heavy duty rotary, electric and special models. Write for Valve Bulletin 34-S.

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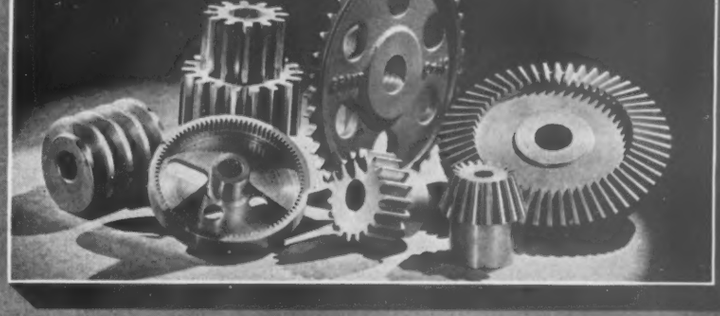
HANNIFIN "Packless" AIR CONTROL VALVES



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GRANT GEAR WORKS — BOSTON, MASS.

melter other than a brass mill. Effect of the provision is to channel brass mill scrap back to those melters who can most efficiently convert it into usable forms of brass.

Copper and copper base scrap (other than brass mill scrap) may be delivered only to dealers, or in cases where a preference rating of A-10 or higher has been assigned to deliveries. An exception to this provision is made for the period from the effective date of the order until Nov. 1, which permits foundries to purchase during that time scrap in an amount not exceeding that consumed by the foundry during the corresponding period in 1940.

No copper or brass mill scrap may be delivered under existing or future conversion, or toll agreements, unless these agreements have been approved by the Priorities Director.

Order prohibits the melting of any scrap by dealers, including that which they may have on hand, without specific authorization from the Director of Priorities. A dealer is likewise prohibited from accepting scrap, unless he has turned over his inventory within the preceding 60 days, and has filed the required reports with OPM. These restrictions are designed to make hoarding unlawful.

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You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
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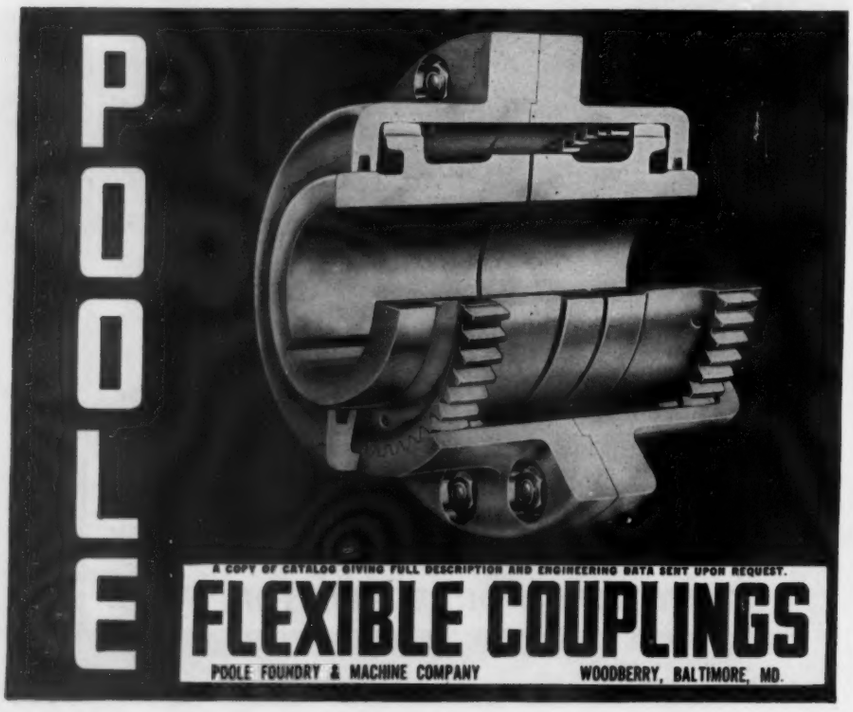
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POOLE FOUNDRY & MACHINE COMPANY
WOODBERRY, BALTIMORE, MD.

Why I Believe Defense Is Being "Sabotaged"

(*Concluded from Page* 30)

cated his dislike for unnecessary formality by ordering something done first and then letting the details follow. I believe his hesitancy in delegating full authority in these matters is traceable to the implications of dictatorship and the abuses which have followed this move in Europe, despite his realization of how necessary it is. I too, am as violently opposed to the European type of dictatorship as he, but at the same time recognize that in an acute emergency drastic methods are often necessary. I therefore submit the following suggestion as to how the priorities log-jam can be solved:

1—Set up plain understandable rules, definitely defining what is meant by such designations as defense, essential civilian requirements, etc.;

2—Appoint a group of carefully selected dictators because of their proven qualifications, give them authority to make absolute and final decisions and hold them accountable for their results.

3—These men would appoint or authorize some person in each business organization to act as their deputy and to pass on the classification and allocation of order; each of these deputies to be held accountable only to his superior dictator.

4—Severe penalties to be imposed on any violations or hoarding.

Let's cut the red tape and go to work!

Mirrors of Motordom

(*Concluded from Page* 40)

bomber dies, large and small, exclusively, indicating the motor companies are adhering to their accustomed procedure of tooling expensive iron and steel dies for stampings, regardless of the fact production runs are comparatively small for bomber parts.

Shortly an entirely new phase of Ford defense production probably will be announced, entirely apart from aircraft engines, bombers, tanks and other items already made public officially and semi-officially. The new development stems from the transfer of a Ford engineer from passenger car equipment buying to an undisclosed phase of defense equipment buying.

There is an interesting story related about this engineer, whose

Simonds

QUALITY GEARS

All types of dependable gears—spur bevel, mitre, worm, rack, internal, etc. from cast and forged steel, gray iron, aluminum, bronze and monel metal. Also silent gears—from steel, rawhide and bakelite.

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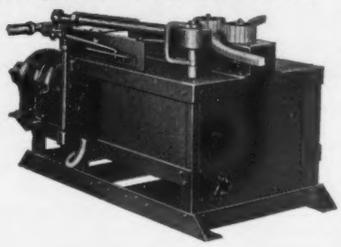
This is a powerful and fast machine for heavy duty work in both fabricating plants or in the field where large tonnage is required. It will handle as high as 20 tons a day. Circles of any size required in concrete reinforcing work from 18 inches in diameter up can be bent on this machine. It will bend bars with two or more radius on the same bar without stopping the machine.



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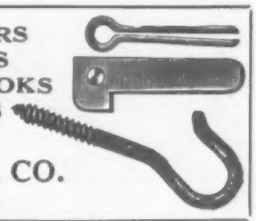

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name is not important for the story. A few weeks ago he was mentioned, not by name, by a gossip columnist in a weekly radio gabfest, as a "fifth columnist" with connections in Germany holding an important engineering post in the Ford plants, the inference being that he might be a spy. As a matter of fact, the engineer until recently had nothing to do with any phase of defense manufacture or planning, in fact scrupulously avoided it. In recent weeks he has been transferred to a new defense activity and has been assembling figures on equipment costs and production rates.

Despite the fact he had a foreign sounding name and in early life received European army training, he is a far cry from any fifth columnist, being one of the most capable engineers on the large Ford staff.

Recent appropriation of better than eight million dollars for a new "aviation parts" plant to be erected by Briggs Mfg. Co. here now is understood to be for a plant to manufacture power-driven gun turrets for aircraft. Experimental and preliminary production work on these turrets has been going on in the Roosevelt plant of Briggs on the west side. Location of the turret plant is not yet known.

Pontiac turned out twice the number of Oerlikon antiaircraft guns originally scheduled for September and has perfected a number of manufacturing shortcuts, such as reducing the time for rifling the barrel from 3 hours and 25 minutes to a mere 30 minutes. Forty-one subcontractors are supplying 175 of the 195 parts used in the gun, and 152 suppliers are furnishing tools, jigs and fixtures, 5000 of which are needed to produce the 20 parts retained at Pontiac.

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CONSTRUCTION and ENTERPRISE

Ohio

CLEVELAND—Cuyahoga Tool & Mold Co., 16131 Holmes avenue, will build 56 x 60-foot addition costing $9000, to increase output of tools and molds. James L. Love is in charge.

CLEVELAND—Pump Engineering Service Corp., 12910 Taft avenue, division of Borg-Warner Corp., Chicago, is seeking site for engineering laboratory building. Plant is busy on defense work.

CLEVELAND — National Bronze & Aluminum Foundry Co., John L. Schmeller, vice president, 8800 Laisy avenue, recently heavily damaged by fire, is seeking temporary quarters to continue its defense production. Rebuilding will be undertaken as soon as possible. Was working on large order for airplane fuselage castings and airplane engine castings.

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 104 and Reinforcing Bars Pending on page 106 in this issue.

CLEVELAND—National Rayon Corp., J. M. Berne, Public Square building, secretary, has been incorporated and has acquired plant of Acme Rayon Co., 1294 West Seventieth street, which will be enlarged and modernized.

CLEVELAND—Osborn Mfg. Co., 5401 Hamilton avenue, is building addition containing 4300 square feet floor space for enlarged manufacturing facilities.

CLEVELAND—Cleveland Cap Screw Co., 2917 East Seventy-ninth street, J. W. Fribley, president, plans plant addition with 26,400 square feet of floor space, to cost about $73,000. Equipment will cost about $175,000. Robert E. Nixon Co., 1737 Euclid avenue, has the contract.

CLEVELAND—General Hard Chromium Plating Co., 13000 Athens avenue, will build a one-story 60 x 140-foot plant. Contract has been given to George A. Rutherford Co., 2725 Prospect avenue. F. A. Katonka, 11408 Continental avenue, is engineer. (Noted Sept. 22.)

CLEVELAND — Hamilton Steel Co., 12941 Taft avenue, is adding 1800 square feet to storage facilities.

CLEVELAND — Newburgh & South Shore Railway Co., 4182 East Seventy-first street, will build two machine shop

WILLIAMS *Buckets*

***for* STEEL MILL SERVICE *are sold under* LIBERAL GUARANTEES**

Specially built of alloy steels for handling heavy ore, slag, scale and skull cracker pit service. All-welded construction at vital points. Catalog FREE.

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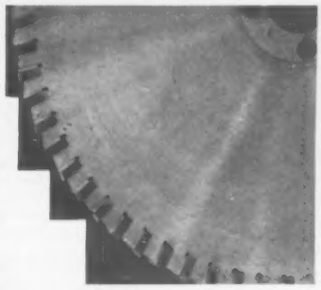
INSERTED TOOTH SAW

Teeth sharpened without removing from blade. Pockets have rounded corners; no tendency to crack. A completely improved Saw, furnished in diameters of 14 to 96 inches; insert teeth always available.



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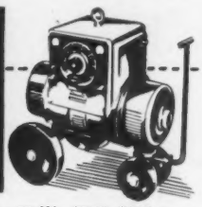

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The **WEINMAN PUMP & SUPPLY CO.**
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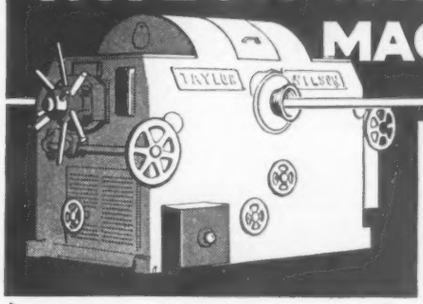
Straightener Specialists Since 1866

TAYLOR-WILSON MACHINE *for*



- Straightening
- Sizing
- Burnishing

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additions, covering 1300 square feet.

CLEVELAND—General Motors Corp. diesel engine division, George W. Codrington, general manager, 2160 West 106th street, will build a boiler plant addition 21 x 37 feet.

DAYTON, O.—United Aircraft Products Inc. has started erection of its fourth manufacturing unit, to be located near Wright field. First unit, to be completed by Dec. 1, will cover 20,000 square feet, arranged for immediate expansion.

ELYRIA, O.—Romec Mfg. Co. will let contract soon for a one-story 100 x 200-foot factory addition to cost about $70,000. Silsbee & Smith, Turner block, are architects.

ELYRIA, O.—Elyria Foundry Co., W. F. Gollmar in charge, Filbert street, will build a one and two-story 20 x 65-foot castings cleaning building, including two overhead cranes, to cost about $30,000. O. D. Conover, 1740 East Twelfth street, Cleveland, is engineer. (Noted Sept. 15.)

LORAIN, O.—City of Lorain, Isaac Neil, service director, Henry Alexander, city engineer, is considering various methods of garbage and refuse disposal and seeking information on incinerators.

YOUNGSTOWN, O.—Cold Metal Process Co., 1200 City Bank building, has incorporated Cold Metal Products Co. to take over its manufacturing activities at 2131 Wilson avenue. Some changes in plant are under consideration. B. J. Lamb is president.

Connecticut

HARTFORD, CONN.—Maxim Silencer Co., 58 Homestead avenue, will build one and two-story 100 x 130-foot and two-story 35 x 100-foot additions. Contract has been let to Industrial Construction Co., 721 Main street, at about $125,000.

NEW BRITAIN, CONN.—Fafnir Bearing Co., 37 Booth street, will build a one-story 42 x 55-foot boiler plant, 15 x 20-foot gas mixer building and 15 x 15-foot pickling house on Myrtle street. Contract to Aberthaw Co., 80 Federal street, Boston, at about $40,000.

WATERTOWN, CONN. — Watertown Mfg. Co., Echo Lake road, will build a two-story resin manufacturing plant costing about $40,000.

Massachusetts

BOSTON—Boston Edison Co., 39 Boylston street, has let contract for a steel trestle and belt coal conveyor on East First street to William Donovan Co., 10 Postoffice square, at about $25,000.

FITCHBURG, MASS.—Fitchburg Gas & Electric Co., 655 Main street, will let contract soon for a one-story boiler plant addition costing about $50,000 Charles T. Main Inc., 201 Devonshire street, Boston, is engineer.

LYNN, MASS.—Lynn Gas & Electric Co., 90 Exchange street, has let contract to Stone & Webster Engineering Corp., 49 Federal sreet, Boston for an electric generating plant costing about $500,000.

PITTSFIELD, MASS.—General Electric Co., Morningside road, will build a one-story 150 x 225-foot plant addition and office building, to cost about $150,000.

Rhode Island

PROVIDENCE, R. I.—Nicholson File Co., 23 Acorn street, will build a one-story 50 x 120-foot power plant addition, general contract to Rowley Construction Co., 260 Central avenue, Pawtucket, R. I., at about $50,000. Jenks & Ballou, 2600 Industrial Trust building, is engineer. (Noted Sept. 22.)

New York

BETHPAGE, N. Y.—Grumman Aircraft Engineering Co., Sheridan avenue, will build a plant addition costing about $3,000,000.

JAMESTOWN, N. Y.—Crescent Tool Co., M. Peterson, president, Foote avenue and Harrison street, will build a plant addition costing over $50,000. Beck & Tinkham, Bailey building, are architects.

New Jersey

NEWARK, N. J.—American Steel Castings Co., Avenue L, will expand its manufacturing and foundry plant at cost of about $500,000.

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Pennsylvania

JOHNSTOWN, PA.—Bethlehem Steel Co., R. E. Hough, general manager, will let contract soon for a power plant addition and improvements, to cost $100,000, without equipment. W. C. Frank, care owner, is chief engineer.

MEADVILLE, PA.—Bonds for $75,000 have been voted for construction of an incinerating plant. R. L. Phillips is city engineer. (Noted May 26.)

READING, PA.—Reading Pratt & Cady division of American Chain & Cable Co., Tulpehocken street and Lebanon Valley railroad, is having plans made by Muhlenberg, Yerkes & Muhlenberg, architects, Ganster building, for an open-hearth building, to cost about $40,000.

Michigan

ST. CLAIR SHORES, MICH.—Assembled Stampings Inc. has been incorporated with $20,000 capital to manufacture metal products, by Robert A. Pichler, 20307 Lawndale avenue.

Illinois

JOLIET, ILL.—Powers-Thompson Construction Co., 27 South Chicago avenue, has been given contract for excavation and substructure for a rod mill 150 x 470 x 80 feet and wire mill 960 x 1500 feet for American Steel & Wire Co., 208 South LaSalle street, Chicago. Project to cost about $2,000,000.

MEREDOSIA, ILL.—Central Illinois Public Service Co., Springfield, Ill., has retained Sargent & Lundy, 140 South Dearborn street, Chicago, consulting engineers, to design a 25,000-kw. power generating plant to be erected here.

ROCK ISLAND, ILL.—War department, through United States engineer's office, Clock Tower building, will take bids Oct. 7 for two 42-foot all-welded steel, diesel powered, twin-screw work launches for delivery to Keokuk, Iowa.

District of Columbia

WASHINGTON—Jesse H. Jones, federal loan administrator, has completed agreement with Reynolds Metals Co. for financing $8,000,000 expansion of aluminum plant at Listerhill, Ala., increasing output from 40,000,000 to 100,000,000 pounds of aluminum annually.

North Carolina

DURHAM, N. C.—Wright Automatic Packaging Machinery Co. has plans by Atwood & Weeks for an additional plant at Calvin and Holloway streets, to cost about $350,000.

Tennessee

CORDOVA, TENN. — National Fireworks Co., West Hanover, Mass., has let contract to Foundation Co., 120 Liberty street, New York, for design and construction of an antiaircraft ammunition plant to cost $500,000.

Virginia

WEST POINT, VA.—Chesapeake Corp. will build an electric generating plant addition costing about $100,000. W. S. Mays, West Point, Va., is engineer.

Missouri

ST. LOUIS—Missouri-Illinois Tractor & Equipment Co. has leased one-story 90 x 140-foot building to be erected at McKissock and Withers avenues. Contract has been given to Murch-Jarvis Contracting Co., 111 North Fourth street. Hari VanHofen, 408 Pine street, is architect.

ST. LOUIS—Laister-Kauffman Aircraft Corp., Jack M. Laister, president, has leased building at 7710 Ivory street for manufacture of gliders for the United

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States army. Erection of plant is planned, at Starling airport on Lemay Ferry road at Meramec river.

ST. LOUIS—Commercial Day-Lite Co., N. D. Giles, president, 1430 Washington avenue, has been organized to manufacture fluorescent lighting fixtures and equipment and is occupying 10,000 square feet of manufacturing space.

ST. LOUIS—Western Metal Products Co., Burnet Outten Jr., president, 2101 Miami street, has been incorporated with $25,000 capital to manufacture metal products, motors, etc. Has 6000 square feet floor space.

ST. LOUIS — Laclede-Christy Clay Products Co., W. T. Hemphill, president, 411 North Seventh street, is undertaking $1,000,000 expansion to enlarge production of defense materials, including two additional kilns, dryers, presses and other equipment, at plant at 5900 Manchester avenue.

ST. LOUIS—Sterling Aluminum Products Co. Inc., John Flammang, president, 2925 North Market street, is building one-story addition to plant, covering 4000 square feet, costing $15,000.

Wisconsin

HALES CORNERS, WIS.—City plans construction of a sewage treatment plant costing about $100,000. Mead, Ward & Hunt, 550 State street, Madison, Wis., are engineers.

MILWAUKEE—A. O. Smith Corp., 3533 North Twenty-seventh street, will build 350 x 400-foot and 200 x 600-foot plant additions, contract to Peters Construction Co., 2901 North Thirtieth street.

Texas

BEAUMONT, TEX.—Texas Shipbuilding Co., S. Perry Brown, 2200 A street, and Keith T. Hotchkiss, will establish a shipbuilding plant at municipal port, pending constructioin of permanent facilities.

GARLAND, TEX.—Gulberson Diesel Engine Co., 1000 Forrest street, Dallas, Tex., will operate $2,411,096 plant for manufacture of radial diesel medium tank motors, to be built by government. Site of 100 acres has been bought and building will cover 150,000 square feet. J. Gordon Turnbull, Dallas and Cleveland, is consulting engineer and architect.

PORT ARTHUR, TEX.—Texasteel Mfg. Co., G. Worth in charge, has bought 250-acre site and has options on 1124 acres adjoining, on which to build $1,000,000 steel plant. H. E. Beyster Corp., Detroit, is engineer. (Noted Aug. 25.)

Kansas

BAXTER SPRINGS, KANS.—Military Chemical Works Inc., subsidiary of Pittsburg & Midway Coal Mining Co., 1004 Baltimore street, Kansas City, Mo., has awarded construction contracts for the Jayhawk Ordnance Works it will operate for the War department, to Freete Construction Co., Pittsburg, Kans., and F. H. McGraw & Co., 780 Windsor street, Hartford, Conn. Cost will be $10,193,000 for buildings and $6,513,100 for equipment. Chemical Construction Corp., 30 Rockefeller Plaza, New York, will design and supervise the project.

KANSAS CITY, KANS.—Fruehauf Trailer Co., Fairfax Industrial district, has awarded contract for a one-story 180 x 500-foot addition to Collins Construction Co., Davidson building. C. E. Keyser, 609 Minnesota avenue, is architect. (Noted Sept. 2).

California

ARVIN, CALIF.—Arvin Forging & Welding Works has been formed by A. J. Ronshusen, to conduct business in steel and iron products.

BERKELEY, CALIF.—Linde Air Products Co., 4050 Watts street, Emeryville, Calif., has let contract to the Austin Co., 1001 Ray building, Oakland, Calif., for design and constructioin of a one-story addition to cost about $111,000.

BURBANK, CALIF.—Thorne Engineering Corp., 3333 North San Fernando road, will build a sheet metal shop 32 x 93 feet, costing about $3000.

LONG BEACH, CALIF.—Douglas Aircraft Corp. is having plans drawn for a new group of steel frame and masonry buildings at its recently-completed plant. Plant cost is covered by accepted letter of intention at $12,619,096.

LOS ANGELES—Nelson Machine Works has been established by W. M. Nelson and H. G. Harris, and will conduct business at 12625 South Main street, Los Angeles.

LOS ANGELES—F. F. Crane is building two machine shop buildings at 5727 Duarte street, 32 x 93 feet.

SAN DIEGO, CALIF.—Fowler Aircraft Co. has been incorporated with $1,000,000 capital by Harlan D. Fowler, E. N. Thacker and Marian Hauber, all of San Diego, A. F. H. Wright, Bank of America building, is representative.

TORRANCE, CALIF.—National Supply Co., 1524 Border avenue, has plans by Taylor & Taylor, architects and engineers, 803 West Third street, Los Angeles, for a plant addition costing over $40,000.

VENICE, CALIF.—Aviation Products has been formed by Vernon C. Brown, Clyde J. Lemm and associates and will conduct business at 518 Washington boulevard.

Oregon

EUGENE, OREG.—Lane county electric co-operative will build 334 miles of electric transmission lines for which $410,000 is available. John W. Cunningham, Portland, Oreg., is engineer.

EUGENE, OREG.—Glenwood district has approved $48,000 bond issue to finance proposed water system and fire protection.

HERMISTON, OREG.—Plans have been prepared by R. H. Corey, consulting engineer, Portland, Oreg., for proposed $205,000 project, involving expansion of water system, new sewer system and disposal plant.

Washington

SEATTLE—Harbor Shipbuilding Co. has been incorporated with $100,000 capital by Bogle, Bogle & Gates, Central building.

SEATTLE — Production Engineering Corp., 1711 Smith Tower, has been organized by E. A. O'Hara and associates, with $20,000 capital, to manufacture tools and machinery.

Canada

MALTON, ONT.—National Steel Car Corp. Ltd., Kenilworth avenue, Hamilton, Ont., will ask bids soon for an addition to its aircraft plant here, to cost $500,000, with equipment.

NEW TORONTO, ONT.—Werner G. Smith, 134 Royace avenue, Toronto, Ont., plans plant addition for production of foundry core oil, to cost $90,000.

OSHAWA, ONT.—Duplate Safety Glass Co. of Canada Ltd., maker of molded plastics, safety glass, etc., is having plans made for a plant addition to cost about $500,000, with equipment.

OTTAWA, ONT.—Department of munitions and supply, G. K. Shiels, Ottawa, deputy minister, will build cartridge plant in the province of Quebec, to cost $1,000,000, for which bids will be called soon.

SAULT STE. MARIE, ONT.—Great Lakes Power Co., Queen street East, will build power plant at mouth of Montreal river to duplicate present unit, costing about $1,500,000, with equipment.

LONQUEUIL, QUE.—Department of munitions and supply, Ottawa, Ont., will ask bids soon for plant addition and engine test house here, to cost $75,000, with equipment. E. J. Turcotte, 1010 Cathcart street, Montreal, Que., is preparing plans.

PERIBONCA RIVER, QUE.—Aluminum Co. of Canada Ltd., 1700 Sun Life building, Montreal, Que., will build power development plant here to cost about $35,000,000 and has given general contract for construction of dam to Foundation Co. of Canada Ltd., 1538 Sherbrooke street, Montreal, Que., at $3,000,000.

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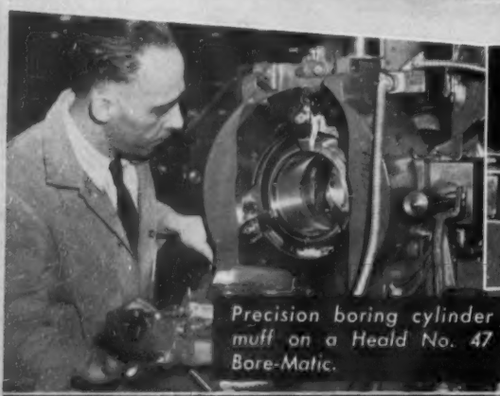
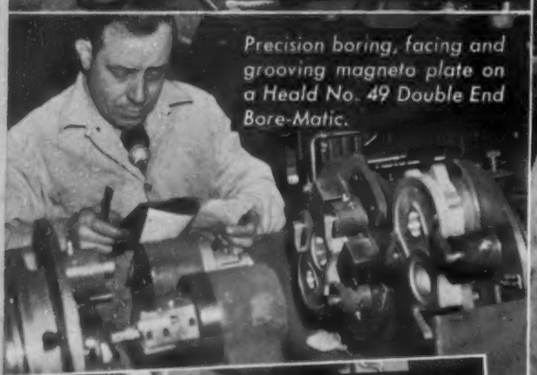


Precision boring cylinder muff on a Heald No. 47 Bore-Matic.

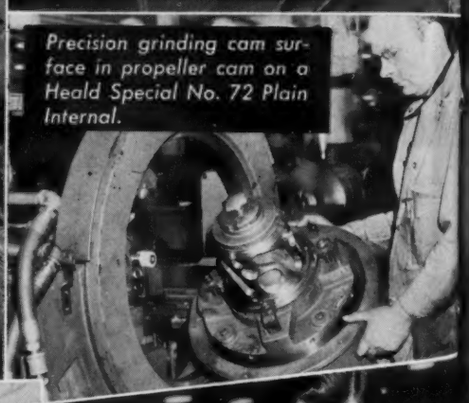
Precision boring airplane engine spark plugs on a Heald No. 49 Bore-Matic.

Precision finishing pin hole in piston with a Heald No. 49 Double End Bore-Matic.



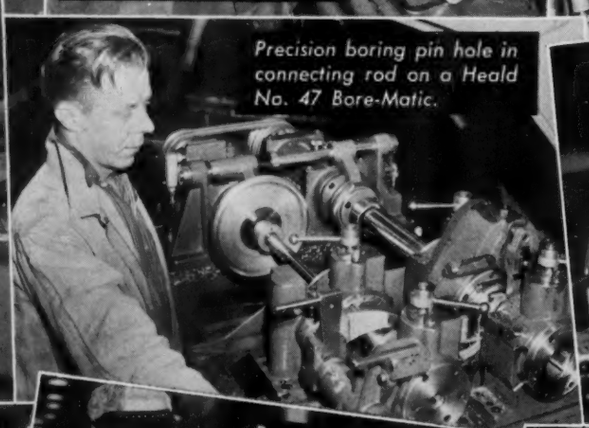
Precision boring, facing and grooving magneto plate on a Heald No. 49 Double End Bore-Matic.

Centerless grinding bore in wrist pins on a Heald No. 81 Centerless Internal.



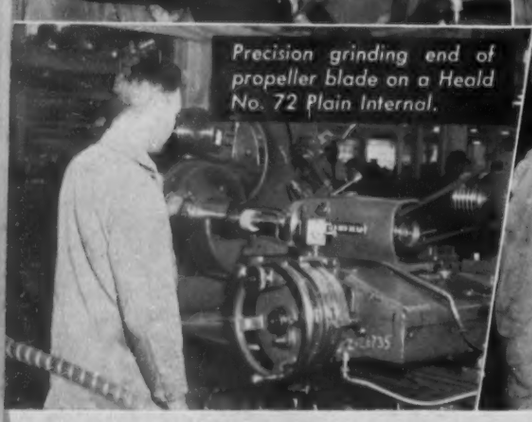
Precision grinding cam surface in propeller cam on a Heald Special No. 72 Plain Internal.

Precision grinding taper seat in propeller hub on a No. 74 Heald Internal.

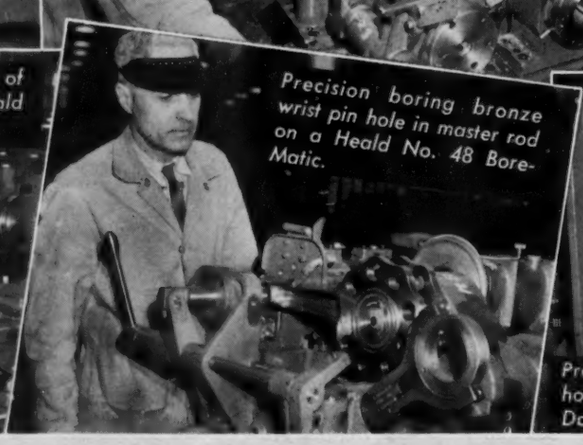


Precision boring pin hole in connecting rod on a Heald No. 47 Bore-Matic.

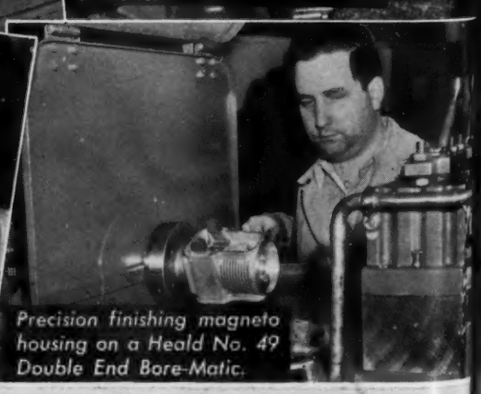
Precision turning and facing reduction gear carrier pins on a Heald No. 47 Bore-Matic.



Precision grinding end of propeller blade on a Heald No. 72 Plain Internal.



Precision boring bronze wrist pin hole in master rod on a Heald No. 48 Bore-Matic.



Precision finishing magneto housing on a Heald No. 49 Double End Bore-Matic.

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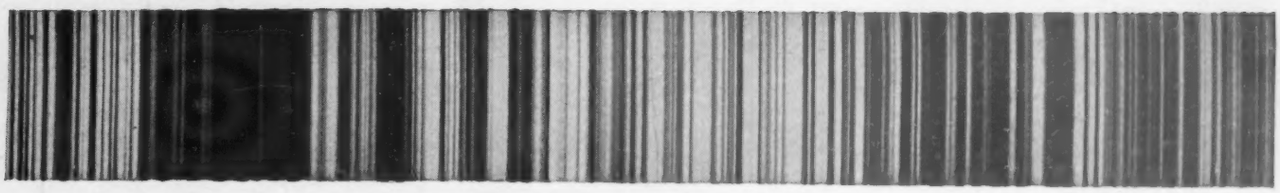

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Bethlehem has planned many other interesting demonstrations and exhibit pieces for the Metals Show. There will be two dramatic movies, showing the manufacture of both wire rope and steel sheets from ore to finished product.

An experienced man with a grinding wheel will demonstrate the technique of "spark testing" as a shorthand check on analysis.

There will be a large display of material and products for national defense in which Bethlehem Steel plays a prominent part.

Other interesting features include a miniature model wire rope strander and a demonstration of heat-treatment and fracture testing of bearing steel.

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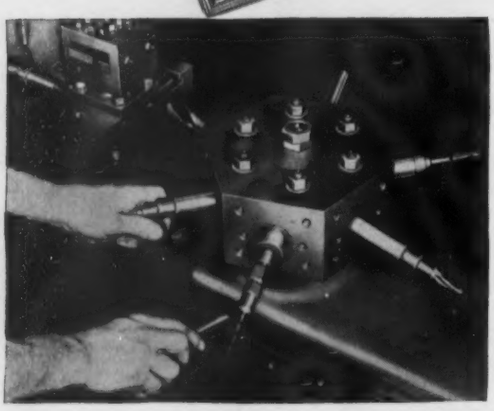
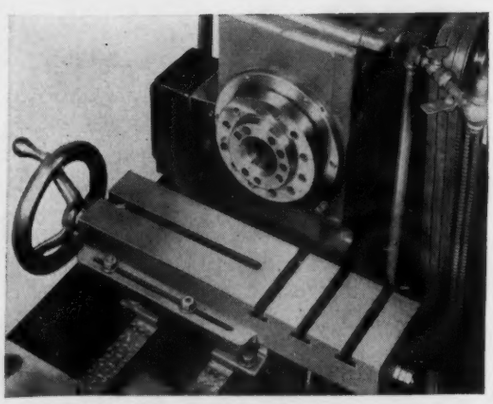
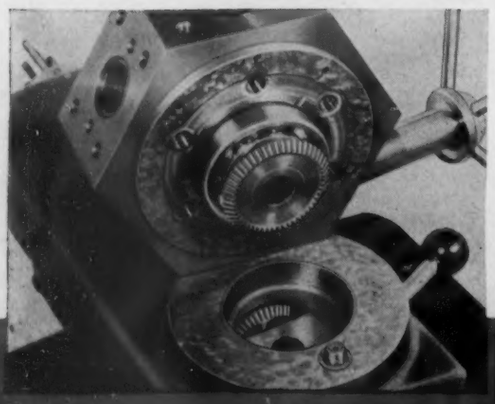


Oster No. 601 has hand operated, hand indexed, six position turret. Each turret face has six tapped holes for mounting various sizes of tool holders.

Spindle nose is No. 6-A1 American Standard Flange Type ground to master gauges. T slots on cross slide permit mounting a variety of tool posts and fixtures.





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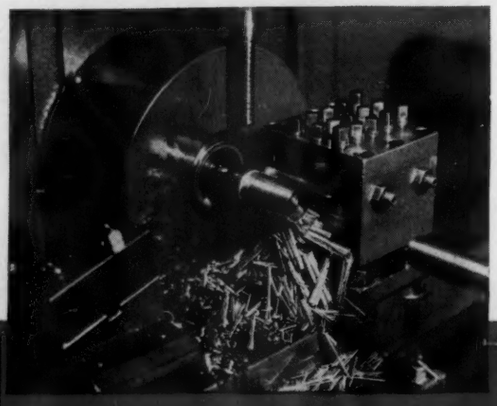

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4. You can have the OSTER No. 601 to suit *YOUR* particular needs: Equipped with the hexagon turret (as illustrated) or with plain saddle and single tool post. No. 601 is furnished with *Worm Drive* or *Direct Drive,* according to your requirements.
5. You can make unusually heavy forming cuts when the No. 601 is equipped with WORM DRIVE.
6. You can get high speed work on small diameters and non-ferrous metals when No. 601 is furnished with DIRECT DRIVE. (Spindle speeds up to 3000 R.P.M. are obtainable.)
7. The price? *Approximately $500.00 less per machine* on a point for point comparison with the nearest comparable machine of equal scope of applications.
8. *PERFORMANCE of No. 601 is proved beyond question!* Hundreds are in action on vital defense work in important plants NOW.

ACT NOW! Wire, 'phone or write for illustrated catalog No. 27-A which explains full details. Or, ask us to have our nearest representative call at your plant.

THE OSTER MANUFACTURING COMPANY

2037 EAST 61st PLACE • CLEVELAND, OHIO

Behind the Scenes with STEEL

New Word

■ "Quicksit" is the latest word to come to the attention of this department, supplementing our special list of metalworking slang. It seems, however, that this is a purely local word confined to certain firms in the middle west. "Giving a Quicksit" to a new man, according to our authority, means to gedunk him in a tank, quenching bath, or other convenient receptacle. In certain very reputable heat-treating departments this is the acceptable routine, like initiating voyagers across the equator for the first time. Just how the Quicksit victim reacts upon the unexpected ducking determines his social standing for a long, long time. Nice clean fun.

Troubles Of An A. M.

■ An advertising manager friend of ours was explaining the other day some of the special troubles an a. m. has in these hectic days of defense. Visiting a plant handling a considerable amount of defense business recently, he secured the necessary permission to shoot photos of what he calls "mosquito scooters," by which he means the familiar industrial tractors and lift trucks we see in almost every big plant today.

His first observation was that they were too blasted efficient. "They were scooting all over the joint," said he, "and me—I was perched precariously on top of a big ladder, with power shafts roaring all around and hotter than Hades. Then I went camera crazy, shooting in every possible direction trying to get one of those crazy devils on the film and at last I thought I had some beautiful shots. But, alas, the Production Manager who had escorted me had disappeared and I descended instead into the waiting arms of two gentlemen whom I strongly suspect of being F. B. I. agents, although they said they just wanted to see me and my camera over in a vacant 'personnel room' where they appropriated all the plates from the camera. But they were gentlemen at that. Two days later I received the films, fully developed—and no bill."

Notes On Abbr

■ We see by the American Standard, *Abbreviations for Scientific and Engineering Terms* that "abbreviations should be used sparingly in text, with due regard to the context and to the training of the average reader."

For both singular and plural words the same abbreviations; you bbl for a barrel or five barrels. Except when the omission would result in confusion, periods after abbreviations are omitted. In 335 F you no longer bump your eye on the temperature sign nor stumble over the period after F. From now on it's per, not /; lb not #; and in., not ″. So now you can see with a psi that pressure is on an engineer to maintain an abs atm of scientific erudition; every sq cm of elec narration is worth its wt in abbr. Oh h! (henry).

The Huffman Prairie

■ Don't miss this week's Wing Tips, the beginning of an exceptionally interesting story of the developments at Wright Field, Dayton, Ohio. Among other things you'll learn how goats are being used as "goats" to determine the effect of high altitudes on combat flyers.

New Movie Clicks

■ "Railroadin'," a full color and sound motion picture, easily passed the test of a special preview over in New York recently. Made by the American Locomotive Co. and the General Electric Co., with the cooperation of American railroads, it is a dramatic story of railroad progress for the past century with many fine scenic views, top-flight pictures of speeding trains, floods, cyclones and mobs. The story goes back to 1830 when there were only 23 miles of rail in the country. Thirty years later there were 30,000 miles and nine years after that the first transcontinental railroad was completed. The picture took a year to complete, and has several well-known Hollywood actors in the main character roles. After simultaneous showings in New York, Chicago, St. Louis and Los Angeles October 21, it will be available through either of the participating companies.

World Traveler

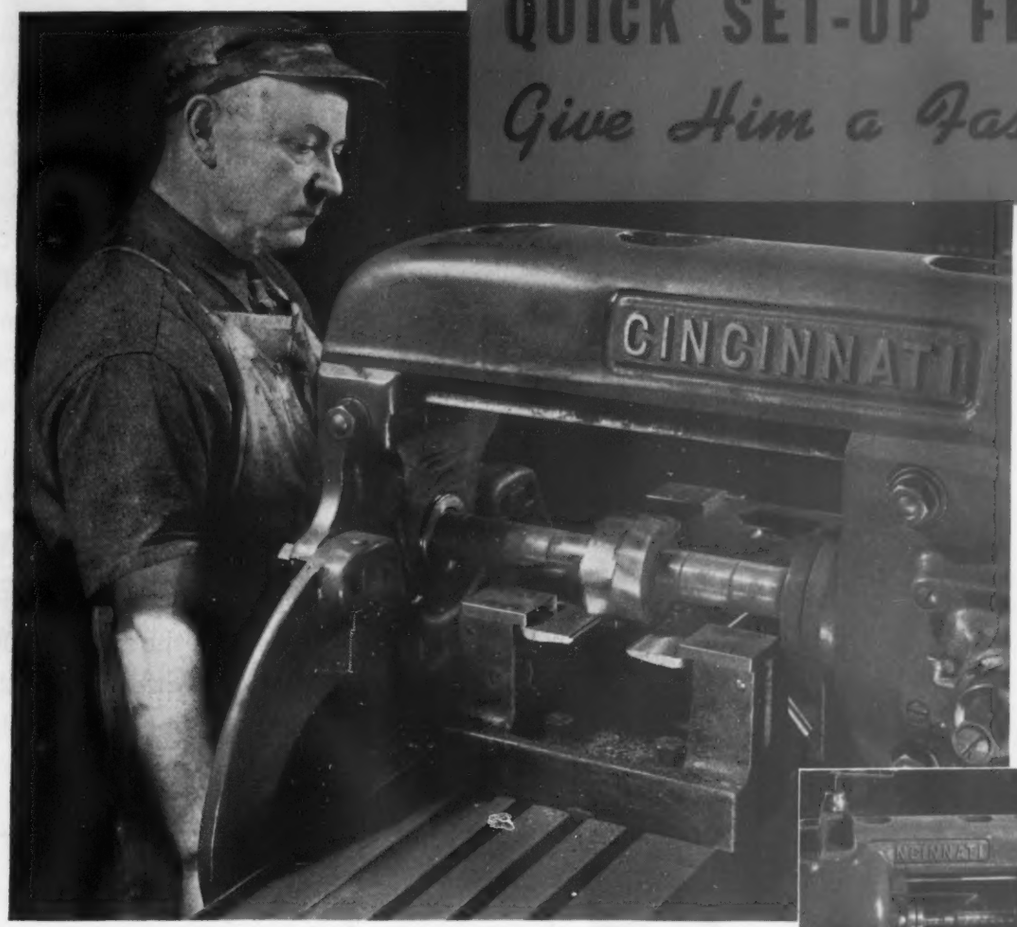
■ Just returned in this morning's mail is a letter which could no doubt spin as interesting a yarn as Pierre Van Paassen, if it could only talk. It has just finished an 8-month trip to the war zone (all for a nickel) but just how close it ever came to its destination we'll never know. It's back on our desk now, having been censored twice and stamped very officially—*Retour a l'envoyeur. Relations postales interrompues.*

Keeping Industry Informed

■ The federal government is looking more and more in the defense emergency to the business publications of the country as a recognized means of quickly and thoroughly disseminating information throughout all industry. This was recently illustrated in connection with the need for the conservation of nickel and an increase in secondary production. With the cooperation of the National Conference of Business Paper Editors, on which STEEL is an active member, the explanation of the need and what to do about it was spread quickly through the pages of STEEL and the rest of the business paper press. Noticeable results have already been achieved and as an outgrowth of this activity more systematic methods in recovering nickel from automobile graveyards and other sources of cast-off machinery have been organized.

Vol. 109, No. 15, October 13, 1941, issue of STEEL, published every Monday at Cleveland, O. Entered as second class matter at the postoffice, Cleveland, O., under act of March 3, 1879. U. S. and Canada, 1 year $4; 2 years $6; foreign countries, 1 year $10; Current issues, 25c.

QUICK SET-UP FEATURES
Give Him a Fast Start



Plenty of "know how" is required to set up jobs like this cast iron sewing machine bed. The operation in the large illustration—milling the throat plate and side plate seat—is one of several, each requiring a different fixture and cutters. Supporting the operator's experience and "know how" are many convenient set-up features which enable him to quickly complete any set-up within the range of the machine—a CINCINNATI No. 2-18 Plain Automatic Miller.

The arbor support and arbor may readily be removed and replaced without removing other parts. One nut clamps and unclamps the quill, which is provided with a micrometer dial for accurate cross adjustment. Covers over the spindle speed and table feed change gear stations are hinged to facilitate changing gears.

These and other features of the CINCINNATI 2-18 combine to produce the parts illustrated at about 2½ times faster than the previous method.

Write for catalog M-965 and see how the 2-18 can pep up your production schedule. Brief description also contained in Sweet's File for Mechanical Industries.

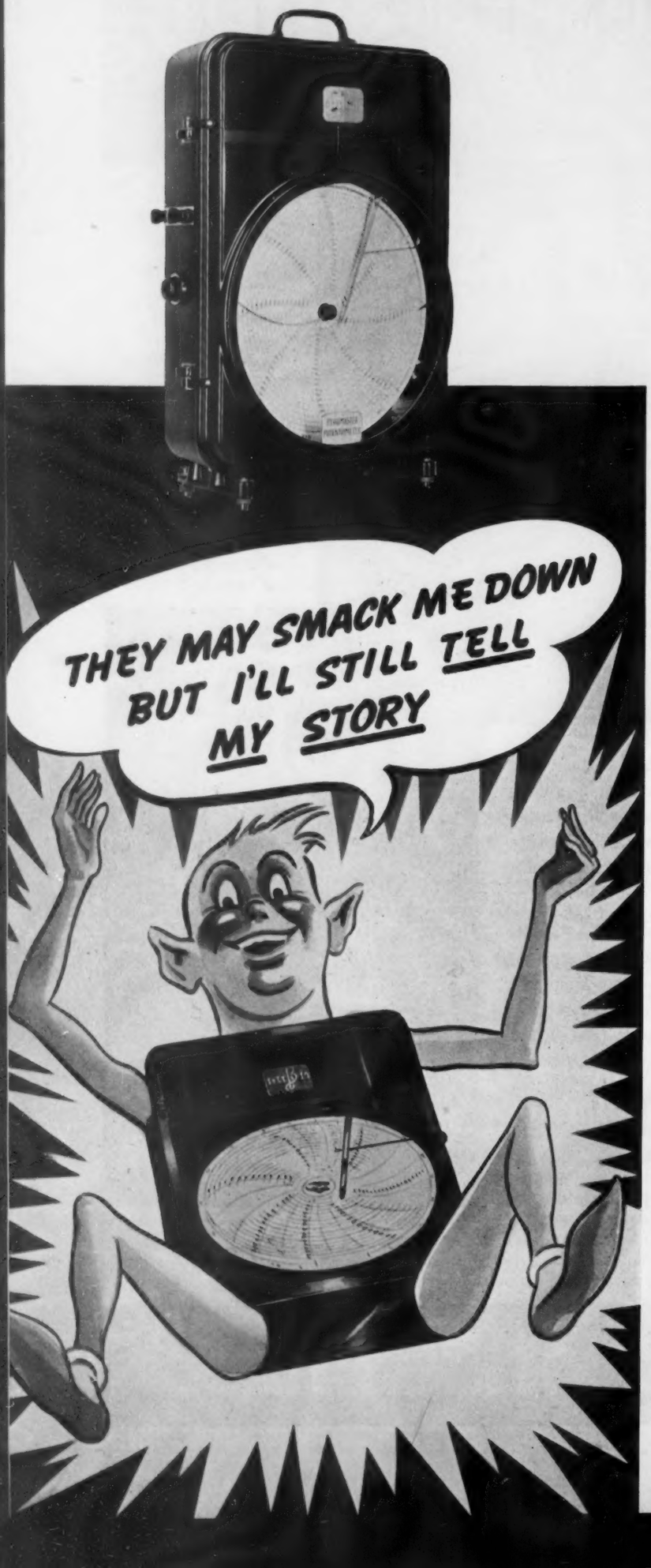
CINCINNATI

THE CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES . . . SURFACE BROACHING MACHINES . . . DIE SINKING MACHINES

BRISTOL'S PORTABLE PYROMASTER

THE ONLY PORTABLE RECORDING POTENTIOMETER



Bristol's Portable Pyromaster is the only instrument of this type that can be carried about from place to place and used to check temperatures at various points in a plant. It is so ruggedly built, so stable under vibration and shocks, that jolts and careless handling do not affect its accuracy of operation. It does not have to be carefully levelled up — will operate tilted at an angle or even lying flat on its back! No particular care need be used in locking the galvanometer while in transit.

HAS ALL THE STANDARD PYROMASTER FEATURES

This Portable Pyromaster is the standard Bristol recording potentiometer with the following advantageous features that distinguish this instrument:

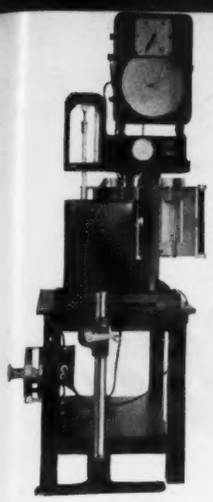
1. Requires no lubrication
2. Not affected by vibration
3. High accuracy
4. No mechanical motion except when temperature changes — reducing wear to a minimum
5. Operating mechanism in 5 separate units with no mechanical connections — securing simplicity and freedom from mechanical troubles.

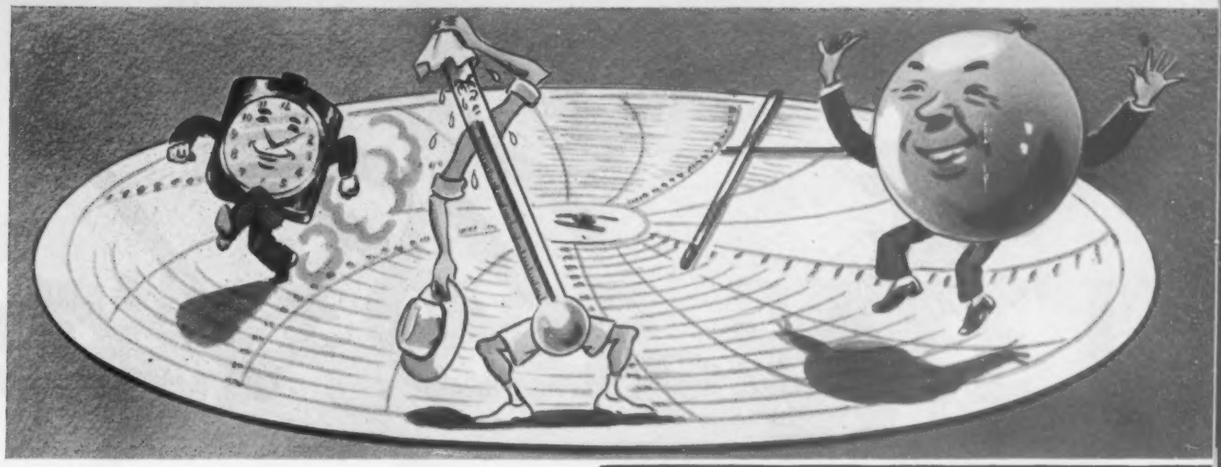
SET ON TABLE, SHELF OR FLOOR . . . USABLE ANYWHERE

Bristol's Portable Pyromaster is equipped with carrying handle and feet, thermocouples, protection wells and lead wires. Thermocouple and protection well are inserted in the furnace and the instrument quickly set up in any convenient spot.

BRISTOL'S

For Complete Information Fill Out and Mail the Coupon





GETS DILATATION, TIME AND TEMPERATURE ON ONE CHART

BRISTOL'S DILATOMETER

The Rockwell-Bristol Dilatometer plots dilatation against both time and temperature on *one* conventional chart, as shown above. No photographing is necessary.

Herein lies the superiority of this instrument over the usual time-temperature method of depicting transformations or criticals for steel and other materials — the point where under intense heat they contract for a while, after first expanding.

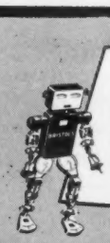
The sharp, clear dilatometric reversals give exact understanding of the metal.

100% American-made, this Dilatometer is an instrument superior to foreign dilatometers now impossible to obtain. And it is *simpler to operate* — needs no expert to run it. Practical for plant laboratory use.

BRISTOL'S

Fill Out and Mail the Coupon for Bulletin 546

Visit Our Exhibit — Booth No. 66
National Metal Congress and Exposition



BRISTOL

... Gives YOU the Most from Heat

THE BRISTOL COMPANY
WATERBURY, CONNECTICUT

AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS

The Bristol Co. of Canada, Ltd.
Toronto, Ontario

Bristol's Instrument Co., Ltd.
London, N. W. 10, England

BRISTOL'S POTENTIOMETRIC TEST SET

THIS SINGLE SET WILL DO THE FOLLOWING:

1. Measure any potential difference not exceeding 91 millivolts
2. Determine the temperature of a thermocouple
3. Check a thermocouple against a standard thermocouple
4. Check a pyrometer of the millivoltmeter type
5. Check a pyrometer of the self-balancing-potentiometer type
6. Check the voltage of a standard cell
7. Measure resistance, including hot thermocouples.

BRISTOL'S

Check and Mail the Coupon for Further Information

THE BRISTOL COMPANY
112 Bristol Road, Waterbury, Conn.

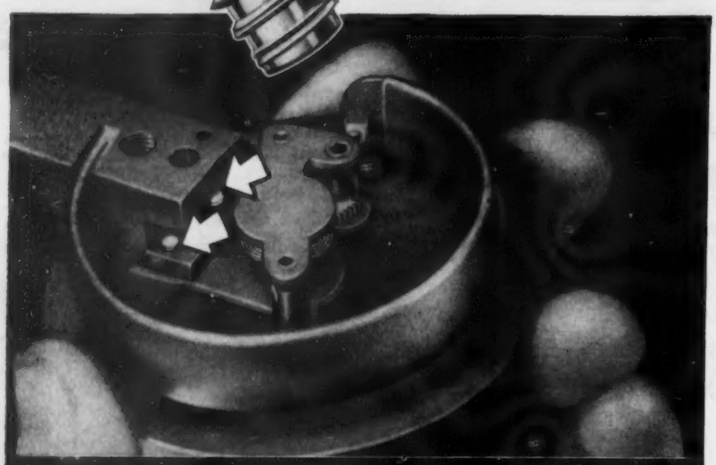
- ☐ Send me Bulletin 507 on the Bristol Pyromaster
- ☐ Send me Bulletin 546 on the Bristol Dilatometer
- ☐ Send further information on Bristol's Potentiometric Test Set

NAME .....

COMPANY .....

ADDRESS .....

28-hour

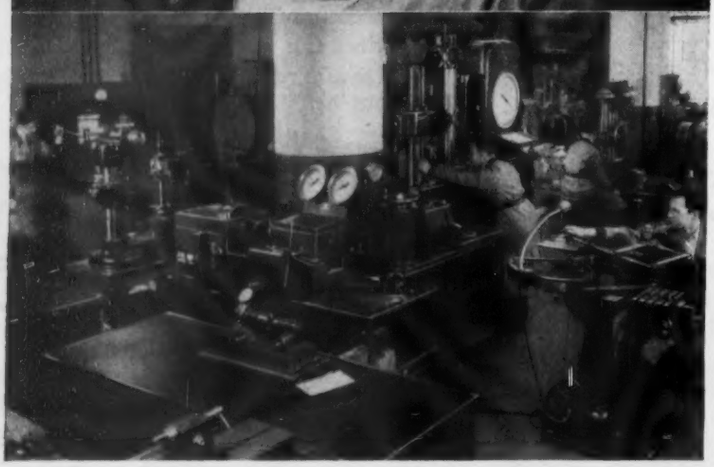


Simplify ASSEMBLY . . .

Not only did assembly engineering improve design but it greatly cut the cost of this Marsh gauge. Formerly, the various units were separately assembled with machine screws, requiring many tapping and hand operations. Now, only 2 Parker-Kalon Self-tapping Screws ruggedly secure gauge movement to the socket. 10 operations saved!

Save OPERATIONS . . .

"Another step to increase production for National Defense", states famous machine tool builder Warner & Swasey, when asked the reason for adopting Parker-Kalon Self-tapping Screws. These screws eliminated slow tapping operations in fastening a work diameter chart to the spindle speed "Preselector".



Cut out "SLOW-UPS" . . .

Your production won't be slowed-up by "doubtful screws" . . . screws that look all right but some of which fail to work right . . . when you use genuine P-K Self-tapping Screws. For the Parker-Kalon Laboratory – without counterpart in the industry – maintains a rigid quality-control over all Parker-Kalon products.

SELF-TAPPING SCREWS FOR EVERY METAL AND PLASTIC ASSEMBLY . . . AND OTHER FASTENING DEVICES

days FOR SALE!

Get together with a PARKER-KALON ASSEMBLY ENGINEER to gain man-hours – speed work

Yes, we're selling time – most precious raw material of all. Every day, in hundreds of plants, large and small, time savings of 25 percent to 50 percent are effected with Parker-Kalon Self-tapping Screws.

You, too, can have these extra hours of production time (1) by saving operations; (2) by simplifying assembly work; (3) by eliminating a common cause of production "slow-ups". This triple saving is yours with the properly engineered use of Parker-Kalon Quality-Controlled Self-tapping Screws.

Such advantages are possible because you eliminate tapping, cost of taps and maintenance of equipment. You save the time of salvaging rejected parts due to crossed and mistapped threads. You need no lock washers to make secure fastenings. You do away with the fumbling that goes with bolts and nuts, and the difficulties of riveting in hard-to-get-at places. You obviate the need for tapping plates on thin sheet metal and for inserts in molded plastics.

To obtain all the benefits of this simpler, better fastening method, get together with a Parker-Kalon Assembly Engineer. He is thoroughly familiar with present-day assembly practices on all sorts of products. His recommendations will be unbiased because Parker-Kalon makes all types of Self-tapping Screws – both thread-forming and thread-cutting – for every assembly of metals and plastics. Besides, he is pledged to recommend Self-tapping Screws only when they offer a better, more economical means of assembly.

Easy to Change – No Skill – No Special Tools

The Parker-Kalon Assembly Engineer will show that no major production changes are necessary . . . no special tools nor skilled hands are required to immediately start adding hours of production time with Self-tapping Screws.

Start Saving Hours – Now!

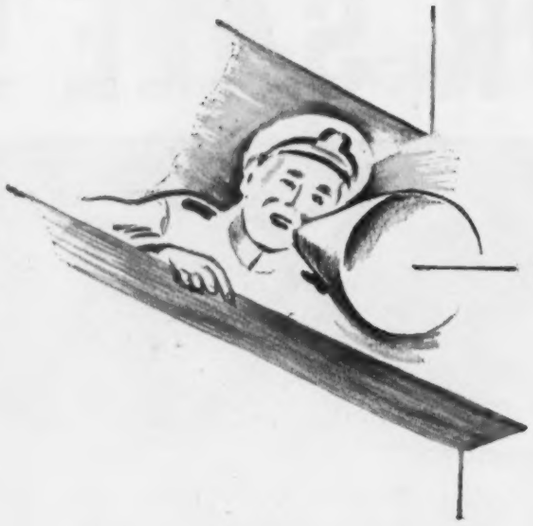
Mail a description of your assembly to Parker-Kalon Assembly Engineers. They will return it with recommendations and samples. Or better: Let a Parker-Kalon Assembly Engineer call at your plant and point out ways of speeding up your assemblies. Parker-Kalon Corporation, 194-200 Varick Street, New York, N. Y.

PARKER-KALON

Quality-Controlled

SELF-TAPPING SCREWS

Give the Green Light to Defense Assemblies



"Full speed ahead • • • landlubbers!"

We've never swabbed a deck or stood a watch . . . . but the salt smell of the briny deep hovers around the plant as vital springs for various instruments and mechanisms are launched by our machines. To help speed equipment for a greater fleet, we are crowding on all possible steam with:

* *A Production Line* for shipment of springs in large or small quantities to meet *your* production line requirements.
* *A Production Line* of heat-treating equipment, batch type and continuous, with carefully controlled atmospheres.
* *A Production Mill* producing unexcelled cold-rolled spring steel.
* *Time-trained craftsmen*...whose life calling is springmaking.

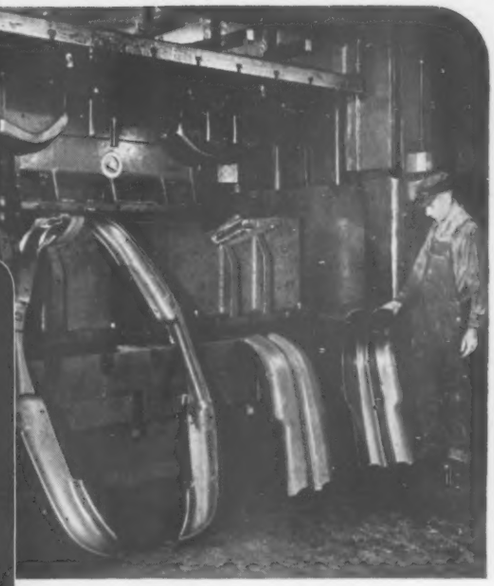
For American Products

Barnes-made Springs

and Spring Steel

WALLACE BARNES CO., BRISTOL, CONN., U.S.A.
DIVISION OF ASSOCIATED SPRING CORPORATION

MORE POWER to The Standard Steel Spring Company



HERE'S a Modern Cleveland Four Point Press which, in itself, provides ONE THOUSAND TONS MORE POWER to the capacity of The Standard Steel Spring Company for the production of bumpers used by many of the leading Automobile Manufacturers, as well as numerous other pressed metal products.

The Press, which is but one of a large number of Cleveland Presses installed in this progressive plant, has 24" stroke, 30" adjustment, 68" shut height, a bed area of 66" x 120" and is equipped with an electrically controlled, air operated friction clutch. The bed of the Press is provided with a triple stage pneumatic cushion and the slide is counterbalanced by air.

In addition to the Four Point Press illustrated, other Cleveland Presses embodying this particular construction, which entirely eliminates overhanging gears and brackets, are the Two Point and Single Point and each of the three types can be furnished in sizes and capacities to suit requirements.

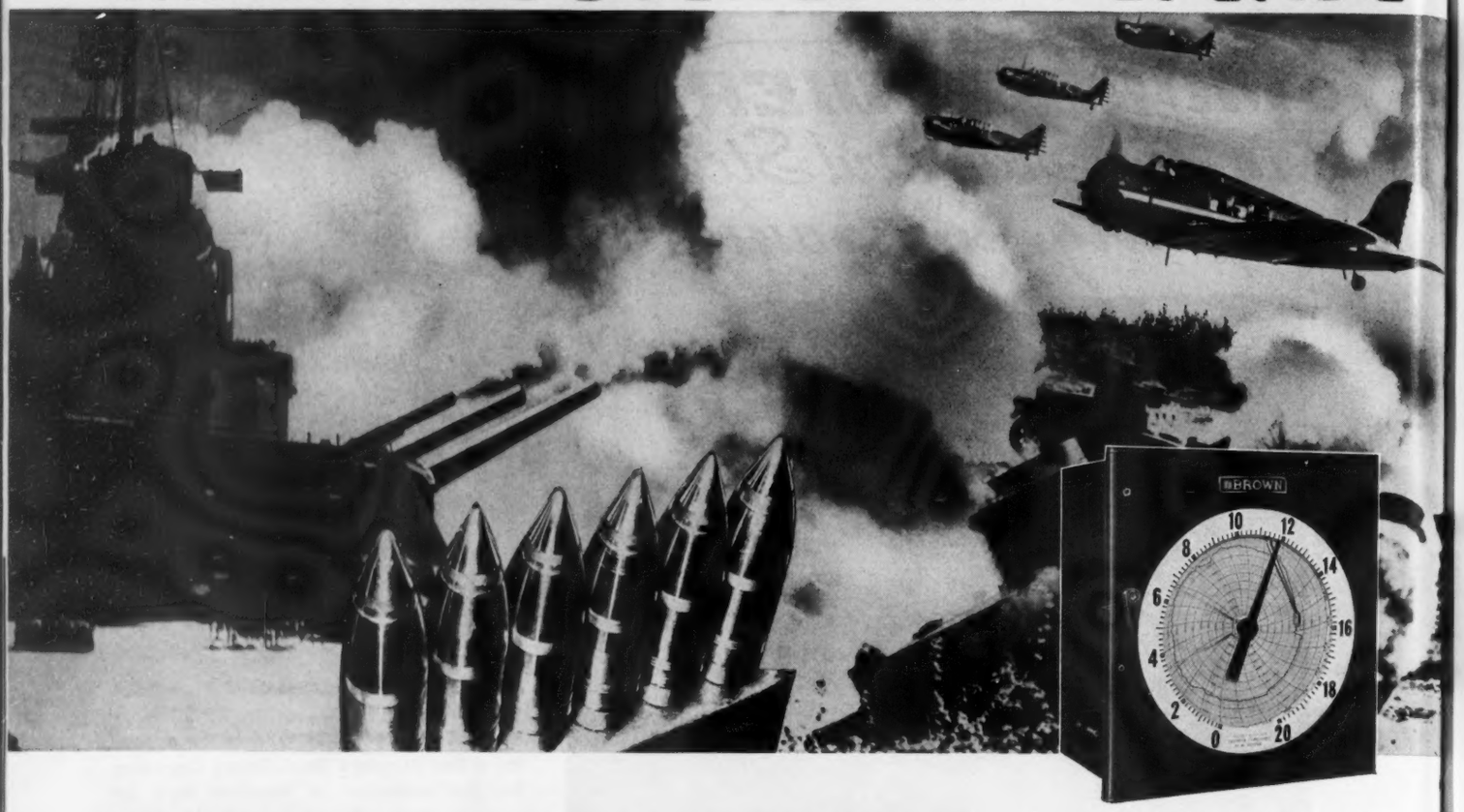
Modern Presses

THE CLEVELAND PUNCH & SHEAR WORKS COMPANY

Cleveland, Ohio

NEW YORK – CHICAGO – DETROIT
PHILADELPHIA – PITTSBURGH

BEHIND THE SCENES IN DEFENSE



NEW BROWN CONTINUOUS BALANCE CIRCULAR CHART POTENTIOMETER

BROWN PYROMETERS

MEASURE AND CONTROL HUNDREDS OF IMPORTANT TEMPERATURES IN THE TREATMENT OF METALS

We do not make Ships, Planes, Tanks or Guns . . . but the INSTRUMENTS we do make are contributing accurate temperature measurement and positive control of furnace operation to practically every steel making and heat-treating process in the Program of National Defense.

Day and Night, our factory is turning out precision Indicating, Recording and Control Instruments that find their places in speeding-up production, eliminating rejects, saving time and money in the treatment of metals for shells, artillery, aircraft, bombs, tanks, ships, torpedoes, armor plate, machine guns, trucks, etc.

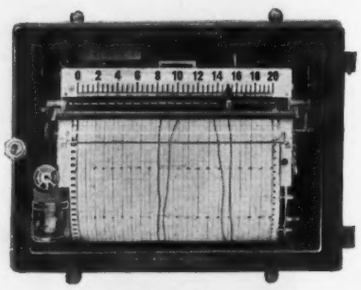
In these times, the heavy demand for Defense requirements has placed a strain on production in all vital industries . . . ours is no exception. To help you, we offer BROWN PERIODIC INSTRUMENT SERVICE.

Like any well-planned piece of machinery, instruments are more dependable when given the proper amount of expert attention. Regular Inspection, Cleaning, Oiling and Checking will safeguard against shutdowns.

Our engineers will inspect and check your instruments against certified standards. They will advise you of the necessity of ordering thermocouples, protecting tubes, leads, etc. Their practical field experience qualifies them to offer technical assistance in heat-treating processes.

The Brown Sales and Service Organization is Nation-Wide. Offices are strategically located to render emergency repairs, regular inspection service or counsel. Discover how little it costs to have your instrument investment protected. THE BROWN INSTRUMENT COMPANY, *a division of Minneapolis-Honeywell Regulator Co.*, 4462 Wayne Avenue, Philadelphia, Pa. Offices in all principal cities. Toronto, Canada: 117 Peter Street.

BROWN RADIAMATIC PYROMETER



BROWN PROGRAM CONTROL POTENTIOMETER PYROMETER

NOTE: Many orders today for Brown Instruments carry a Preference Rating. To save time, PRIORITY EXTENSION CERTIFICATES should be forwarded with such orders—made out to THE BROWN INSTRUMENT CO.

AT THE NATIONAL METAL CONGRESS AND EXPOSITION

Booth 63, Philadelphia, the following Brown Instruments will be on display: New Continuous Balance Circular Chart Potentiometer . . . Radiamatic, Program Control, Proportioning Control, Multiple-Recording Pyrometers . . . Protectoglo System . . . Thermometers and Pressure Gauges. Write for Catalogs.

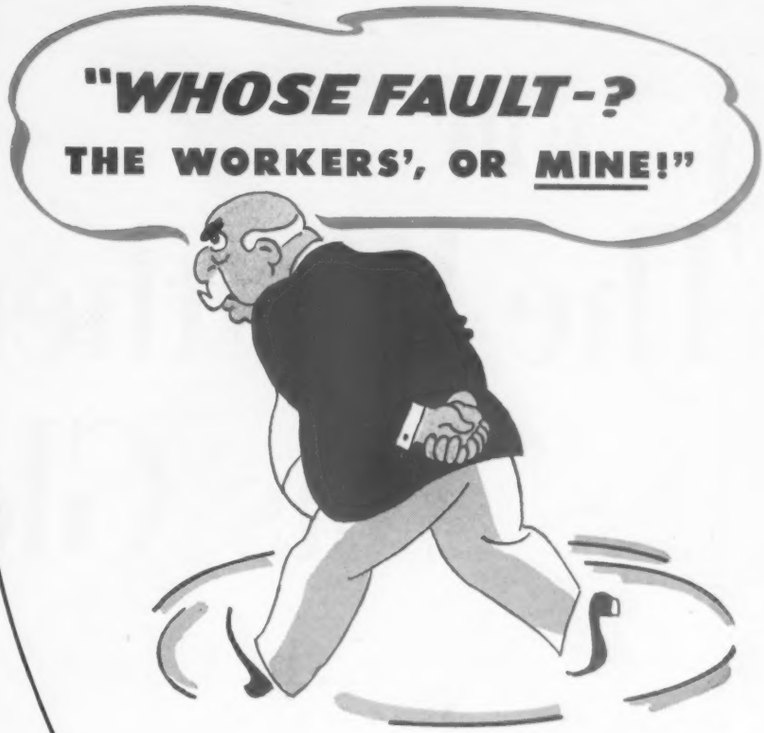
BROWN TEMPERATURE CONTROLLERS
AND MINNEAPOLIS-HONEYWELL CONTROL SYSTEMS

To Measure and Control is to Economize

THEY WERE SLOW . . .
particularly on screw-driving operations. I decided to *go to the assembly line,* see what the trouble was.

THEY WERE SORE . . .
fumbled screws, crooked screws, slipping drivers, slow work . . . everywhere! Was it their fault? Then the truth flashed into my mind . . .

WORK WAS SPOILED . . .
by slotted screws! Hand driving wasted precious time. Even then—drivers slipped, scarring work, injuring hands. No wonder morale was low!



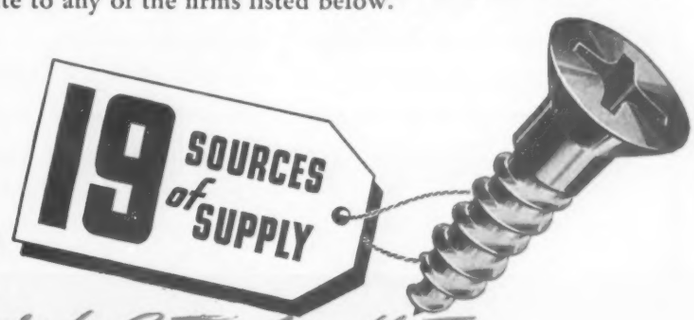
"TRY PHILLIPS SCREWS"
. . . and *power* drivers," I said. So we paid a little more for screws and began to save a lot in time and money. Now we . . .

- start FAST with *one* hand
- drive FAST with *power* drivers
- drive FAST in awkward positions
- finish FAST without danger of slipping
- seat FAST in neat, tight assembly.

The patented Phillips Recessed Head clings to the driver. Thousands of manufacturers — in scores of industries — today are finding that it pays to pay a little more for screws . . . to get Phillips' money-saving advantages in operation. For further facts, write to any of the firms listed below.

PHILLIPS

RECESSED HEAD SCREWS



Speed Product Deliveries by Cutting Assembly Time

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Lock Washer Co., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N. H.

WHY
The Weather Was Glorious
. . . in Chicago . . . 30 years ago!

YES, THE WEATHER *was* glorious—30 years ago—in the Pompeian Room of Chicago's famous landmark—the Congress Hotel! For the first time, Old Man Weather had been tamed. Now, by the throw of a switch, cool comfort could be "turned on" instantly—cool comfort manufactured by America's first commercial installation of complete year 'round air-conditioning for comfort purposes—engineered and installed by Sturtevant!

Sturtevant also pioneered in 1910—by introducing the first commercially engineered system for railway passenger car air-conditioning. And, even as early as 1906, Sturtevant had installed an industrial process air-conditioning system for cooling, dehumidification and air-circulation, at the plant of a well-known chocolate manufacturing concern, in Boston, Mass.

Today, the list of Sturtevant air-conditioning installations is endless. For example, Sturtevant air-conditioning systems or equipment are installed in over 25 large government buildings, alone, in Washington, D.C.

A majority of all air-conditioned passenger cars in both Canada and the United States is equipped with Sturtevant air-conditioning equipment or systems.

And, in industry, where air-conditioning is vitally essential in the manufacture of products ranging from cigarettes to Nylon, Sturtevant Industrial Air-Conditioning is serving

Sturtevant
Puts Air to Work
in
Air Conditioning

Left: POMPEIAN ROOM of Chicago's Congress Hotel, where 30 years ago America's first commercially engineered and manufactured complete comfort-air-conditioning system was installed by Sturtevant.

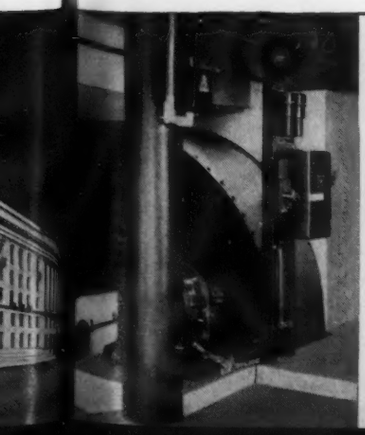
Right: STURTEVANT AIR-CONDITIONING System in Department of Justice Building, Washington, D.C., is one of world's largest.

hundreds of plants such as E. I. du Pont de Nemours, Celanese Corporation, Tubize-Chatillon Corp., Philip Morris, Libbey-Owens-Ford, Life Savers, Inc., and many others.

B. F. STURTEVANT COMPANY
Hyde Park, Boston, Mass. *Branches in 40 Cities*
B. F. Sturtevant Company of Canada, Ltd., Galt, Toronto, Montreal

Sturtevant
REG. U. S. PAT. OFF
Puts Air to Work

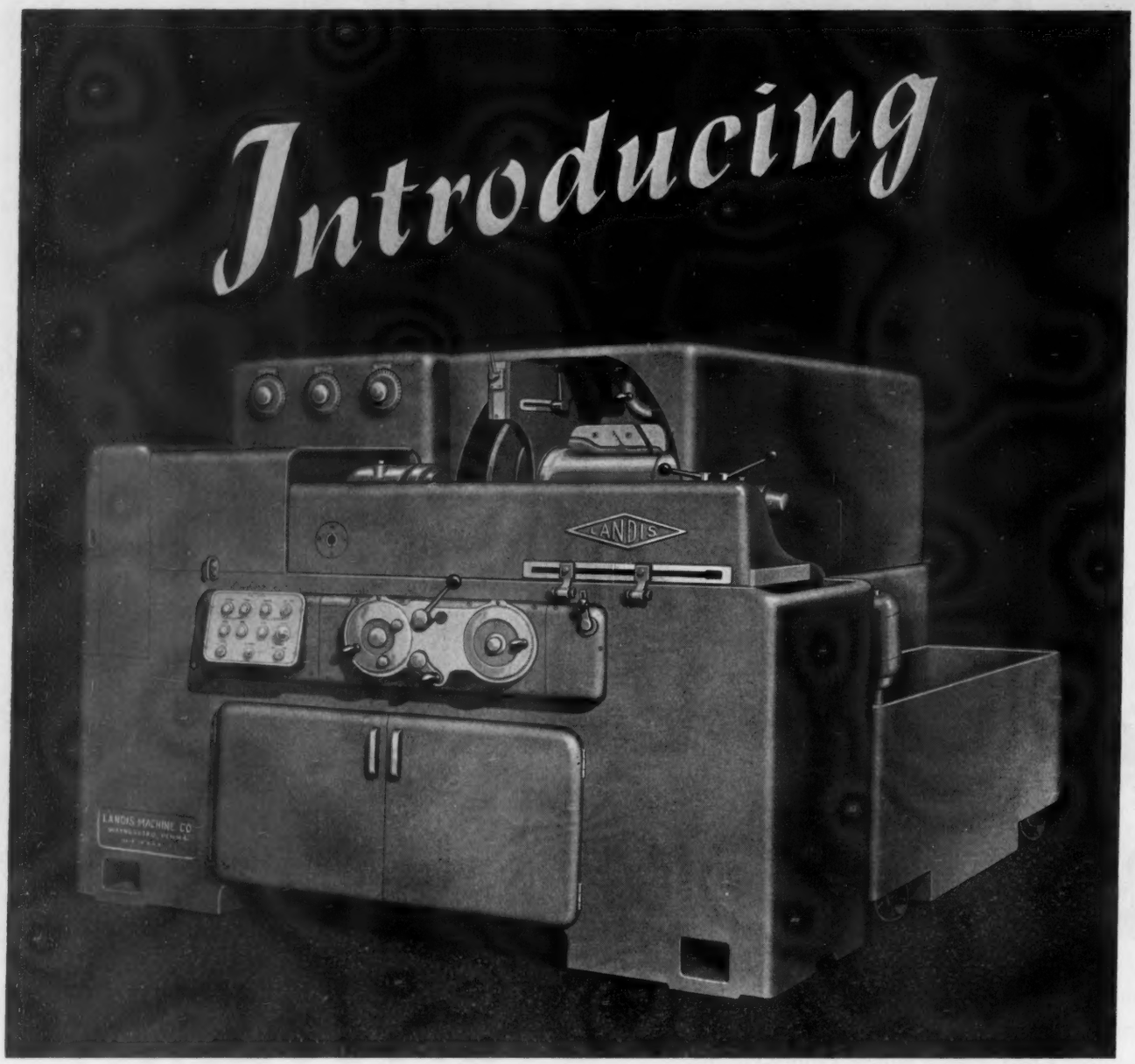
STURTEVANT — FOUNDER OF THE AIR HANDLING INDUSTRY



STURTEVANT INDUSTRIAL AIR-CONDITIONING apparatus installed in 1906 in a Boston chocolate manufacturing plant.

CRACK STREAMLINERS —'Twentieth Century' of New York Central and 'Broadway Limited' of Pennsylvania — are equipped with Sturtevant Air-Conditioning and Ventilating Equipment.

STURTEVANT INDUSTRIAL AIR-CONDITIONIN plays a vitally in portant role in th great Philip Morr cigarette plant, 20 & Cary Streets, Ric mond, Va.



The LANDIS No. 6 PRECISION THREAD GRINDER

—By the builders of LANDIS Threading Machines, Die Heads and Collapsible Taps

The LANDIS Precision Thread Grinder is designed to meet industry's demand for the more rapid production of threads of extreme accuracy and quality finish. It represents the latest development in a modern, high-speed Thread Grinding Machine resulting from years of experience in designing and building machines of this type for use in grinding the thread form of LANDIS Collapsible Tap Chasers, both circular and radial, and hobs used in the manufacture of LANDIS Tangential Chasers.

Write for Bulletin and Complete Specifications

LANDIS
MACHINE COMPANY, Waynesboro Pennsylvania

GULF INDUSTRIAL LUBRICATION

DOWN TO CASES

with

Gulf Engineering Service

Turn the page for actual examples of the benefits secured by calling in a Gulf engineer.

GULF INDUSTRIAL LUBRICATION

Here's how GULF ENGINEERS are helping solve production problems in the METAL WORKING INDUSTRY

Case No. 10484 . . . a prominent screw machine products company, manufacturing aircraft engine valve spring collars from S.A.E. 6150, a chrome-vanadium alloy, decreased rate of tool grinds from 2-hour to 37-hour intervals by following the suggestions of a Gulf engineer.

Case No. 1091 . . . a large power plant equipment manufacturer, producing super-heater plugs on Cone automatics, increased production per tool grind 50% with the correct application of Gulf Electro Cutting Oil.

Case No. 4045 . . . a prominent hardware manufacturer engaged in defense work eliminated several costly handling operations by employing Gulf's advanced methods of cleaning metal.

Case No. 7642 . . . a brass company, adopting rolling methods recommended by a Gulf engineer, obtained a large order for parts. Their officials give Gulf credit for this profitable business.

Case No. 8364 . . . a large hardware manufacturer engaged in defense work had a difficult thread-rolling problem. A Gulf engineer was called in, and production was stepped up 20% by following his recommendations.

Case No. 1023 . . . an airplane manufacturer reduced scrap loss in the drawing of aluminum nose blocks and wing surfaces from 40% to less than 1½% by the use of the lubricants and methods recommended by a Gulf engineer.

Case No. 11121 . . . a large Diesel engine manufacturer increased tool life 40% by the proper application of the right Gulf cutting oil in its turret lathes and also effected an increase in production per tool grind on a difficult gear-hobbing operation.

Case No. 13617 . . . a large firearms manufacturer now making machine guns increased output per tool grind 75% by taking advantage of a Gulf engineer's cooperative service.

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Gulf Engineering Service
can help lick your production problems

In all metal working operations today—machining, forming, drawing, cleaning, quenching, rust prevention—Gulf has studied the problem and developed the correct petroleum product for each job. Gulf's large staff of specialists know just how to apply these products — and with a thorough knowledge of related mechanical and operating problems, they get truly remarkable results.

The entire Gulf engineering organization is geared to help you production men in the present emergency. In many cases, output can be stepped up appreciably by following the recommendations of a Gulf engineer. Or, costly "bottlenecks" can often be avoided by having a Gulf engineer check over your tough jobs with you. And *there's no extra charge* to get the benefit of this cooperative service—so why not take advantage of it without delay. Simply mail the card below, which requires no postage.

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Gulf Building
Pittsburgh, Pennsylvania

Gentlemen:

Without obligation, please have a Gulf engineer call to discuss some of our production problems.

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COMPANY.....

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Mail this card today

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★ "I am an AMERICAN CHAIN. I've been working for many years on the railroads of America, on her ships, in her mines, forests, smelters, factories—wherever Americans need chains to help them lift, haul or hold.

"Big jobs, little jobs—all sorts of jobs. From Alaska to Key West, from Bangor to San Diego, from Duluth to New Orleans.

"I come in every type and shape and size in welded and weldless. In steel, iron or alloy as best suited to the job.

"I've noticed lately I get better care and believe me I appreciate that. I'm tough and long-lived even when abused and neglected. But it's only common sense to keep me clean, to protect me from the elements when I'm not working, to lubricate me when I'm on a job that requires lubrication.

"They say taking care of me better conserves metals for National Defense.

"Back in the American Chain plant at York they're working day and night, making more chains and testing. They test all the time. And research —they never stop."

AMERICAN CHAIN DIVISION
YORK • PENNSYLVANIA
In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.

ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

UNION SUPERCUT-

the fastest-machining Bessemer Screw Steel made today . . .

Union SUPERCUT always has been a fast-machining steel — and a *uniform-machining* steel.

When first developed in 1928 by Union Drawn—pioneer in the cold finished industry—it was the first, the *ORIGINAL* high-sulphur Bessemer Screw Steel—even then an ideal combination of high machinability, fine machined surface and long tool life.

Production efficiency immediately jumped to new highs. Much time previously lost by shut-downs for tool changes was saved. Increases in output of 50 to 100% were not unusual, with some rising to 200% and higher. New standards for automatic screw machine output were established. Builders of "automatics" redesigned their machines to take advantage of SUPERCUT's higher machinability.

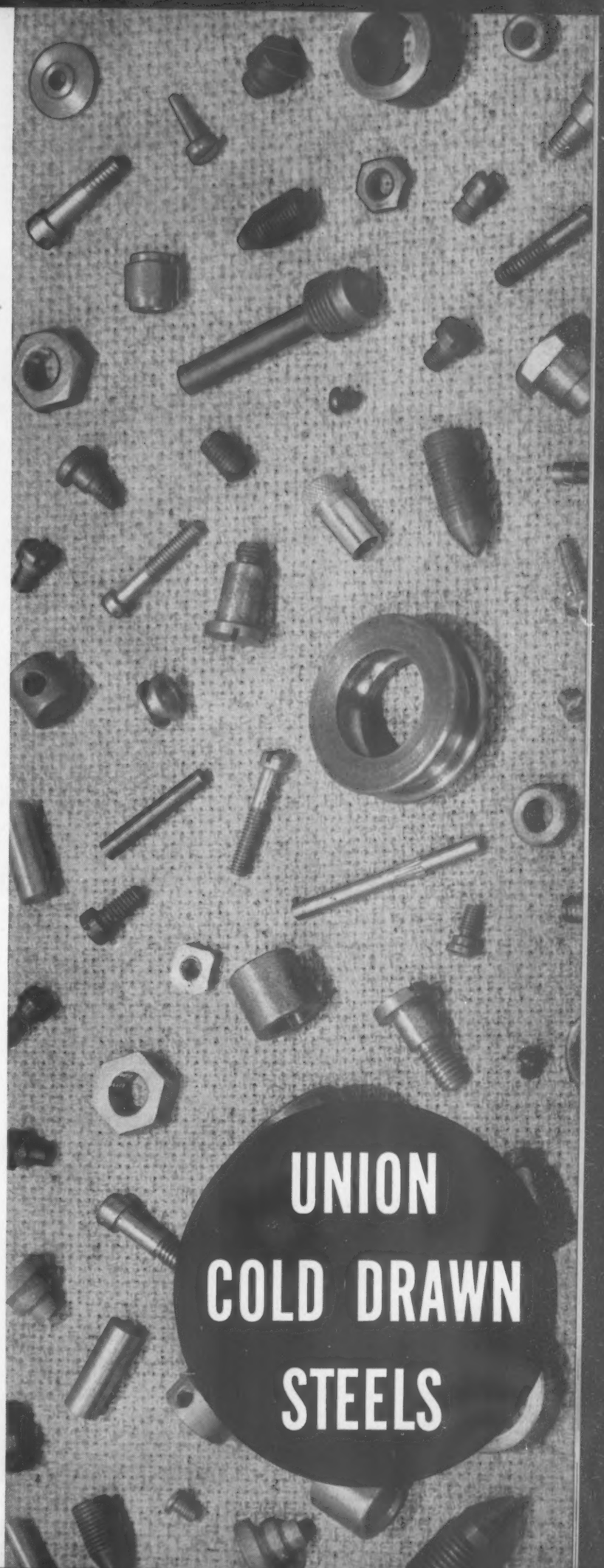
But Union Drawn metallurgists were not satisfied. SUPERCUT underwent a long series of improvements that further increased machinability *without sacrifice*

. . . MEETS THE DEMAND FOR FASTER PARTS PRODUCTION

of soundness, largely eliminated tool-wearing and life-shortening abrasive elements, and produced a uniformly smooth, bright machined surface even at highest speeds. And with these improvements, physical and heat-treating properties remained unchanged.

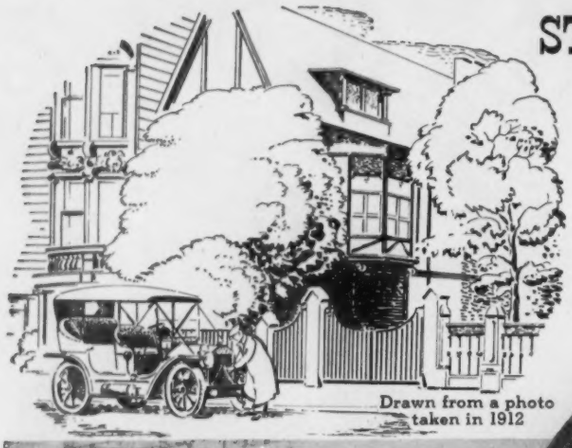
Now, with the demand for acceleration in steel parts production becoming more and more intense, these qualities of Union SUPERCUT become more and more important to steel parts manufacturers who must maintain a high rate of output.

Speed in machining is vitally essential today—but so, too, is low cost per finished part—to realize a profit. To insure *BOTH* —and to help us effect more simplified production schedules that will place us in a better position to meet your requirements for steel—specify Union SUPERCUT — *the fastest-machining Bessemer Screw Steel made today.* Union Drawn Steel Division, Republic Steel Corporation, Massillon, Ohio.



MANY THINGS HAVE GONE SINCE 1912 BUT THIS GATE STAYS YOUNG BECAUSE

...it's Hot Dip Galvanized



Drawn from a photo taken in 1912

Unretouched photo of Sprague gate taken in 1941

● Since this gate began its long, maintenance-free life, billions of dollars worth of other steel products have rusted away . . . A needless waste of money that means higher living costs for every American and a possible shortage of this metal for more vital needs . . . The obvious answer to this is Hot Dip Galvanizing—first, because zinc is the most economical rust protection known to modern science; second, because the Hot Dip Process provides a *thicker* coating of zinc; and third, because it fuses the *zinc* into the steel and makes the coating an inseparable part of the product . . . Many Hot Dip Galvanized Products are still on the job after more than 50 or 60 years of severe service . . . Patronize our members and *know* that you get a genuine, quality Hot Dip coating every time . . . AMERICAN HOT DIP GALVANIZERS ASSOCIATION, INC., American Bank Building, Pittsburgh, Pa. Write for literature.

IF IT CARRIES THIS SEAL IT'S A JOB WELL DONE

Acme Galvanizing, Inc., Milwaukee, Wis. ★ Acme Steel & Malleable Iron Works, Buffalo, N.Y. ★ American Tinning & Galvanizing Co., Erie, Pa. ★ Atlantic Stamping Co., Rochester, N.Y. ★ Atlantic Steel Co., Atlanta, Ga. ★ Buffalo Galvanizing & Tinning Works, Inc., Buffalo, N.Y. ★ Diamond Expansion Bolt Co., Inc., Garwood, N.J. ★ Equipment Steel Products Division of Union Asbestos and Rubber Co., Blue Island, Ill. ★ The Fanner Mfg. Co., Cleveland, O. ★ John Finn Metal Works, San Francisco, Cal. ★ Galvanizers Incorporated, Portland, Oregon ★ Thomas Gregory Galvanizing Works, Maspeth, N.Y. ★ Hanlon-Gregory Galvanizing Co., Pittsburgh, Pa. ★ James Hill Mfg. Co., Providence, R.I. ★ Hubbard & Co., Oakland, Cal. ★ Independent Galvanizing Co., Newark, N.J. ★ International-Stacey Corp., Columbus, O. ★ Isaacson Iron Works, Seattle, Wash. ★ Joslyn Co. of California, Los Angeles, Cal. ★ Joslyn Mfg. & Supply Co., Chicago, Ill. ★ L. O. Koven & Brother, Inc., Jersey City, N. J. ★ Lehigh Structural Steel Co., Allentown, Pa. ★ Lewis Bolt & Nut Co., Minneapolis, Minn. ★ Missouri Rolling Mill Corp., St. Louis, Mo. ★ The National Telephone Supply Co., Cleveland, O. ★ Penn Galvanizing Co., Philadelphia, Pa. ★ Riverside Foundry & Galvanizing Co., Kalamazoo, Mich. ★ San Francisco Galvanizing Works, San Francisco, Cal. ★ The Sanitary Tinning Co., Cleveland, O. ★ Standard Galvanizing Co., Chicago, Ill. ★ Wilcox, Crittenden & Company, Inc., Middletown, Conn. ★ The Witt Cornice Company, Cincinnati, O.

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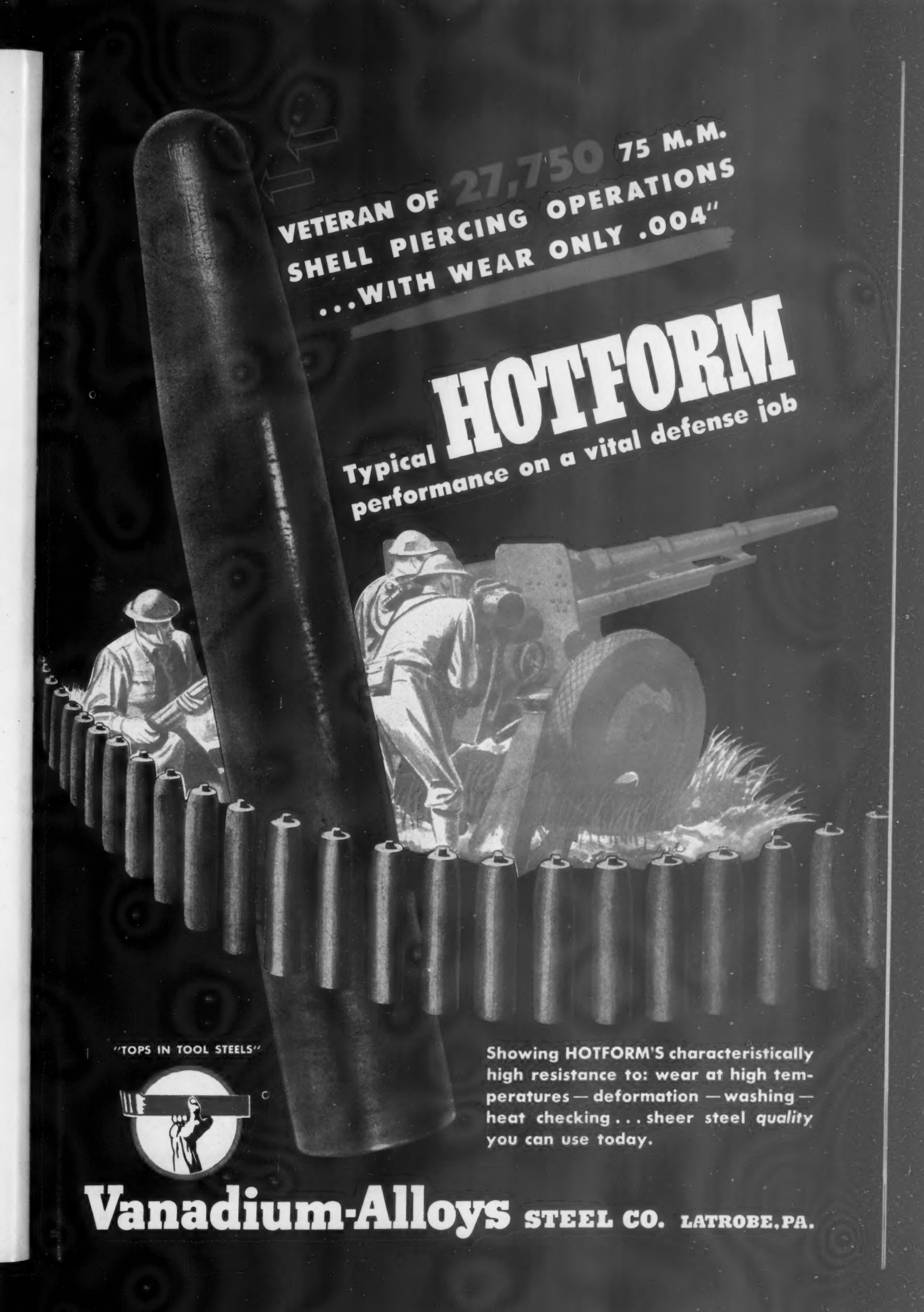
PROTECTED BY GENUINE

HOT-DIP GALVANIZING

AMERICAN HOT DIP GALVANIZERS ASSOCIATION INC.

From our files — CASE NO. 2604. Gate at 2124 Green St., San Francisco. Galvanized for Carmen Sprague in 1912 by San Francisco Galvanizing Works.


VETERAN OF 27,750 75 M.M.
SHELL PIERCING OPERATIONS
...WITH WEAR ONLY .004"
Typical HOTFORM
performance on a vital defense job
"TOPS IN TOOL STEELS"
Showing HOTFORM'S characteristically high resistance to: wear at high temperatures — deformation — washing — heat checking . . . sheer steel quality you can use today.
Vanadium-Alloys STEEL CO. LATROBE, PA.

Far less Traffic Delay

Thanks to WELDED CONSTRUCTION which PERMITTED 87½% of this underpass frame TO BE FABRICATED IN THE SHOP

87½% shop fabricated — that's what welded construction permitted in the fabrication of this 250-ton steel frame for a skewed railway crossing over a city street. The remaining 12½%—which consisted of 436 linear feet of welding — was completed on the job in fast time. This speedy construction meant less traffic delay . . . fewer time-consuming detours. Once installed the welded frame assures long years of trouble-free service because the welds were properly made with Airco electrodes and Airco-Wilson Arc Welders. Such welds are strong, dependable, permanent.

Just as Airco products helped speed this job to completion, they can be an important aid to faster fabrication wherever metal must be joined or cut, hardened or softened, descaled or cleaned prior to painting. An engineering service, really worthy of the name, is your assurance of best possible results. Write for full details on any application of the oxyacetylene flame or electric arc.

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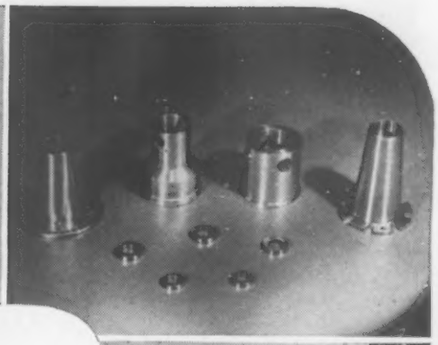
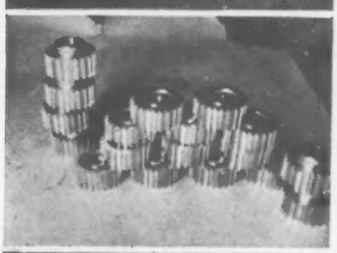
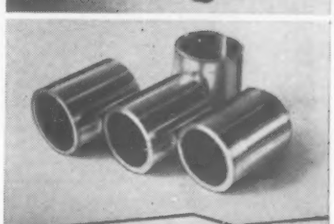
AIRCO — WILSON

Anything and Everything for GAS WELDING or CUTTING and ARC WELDING







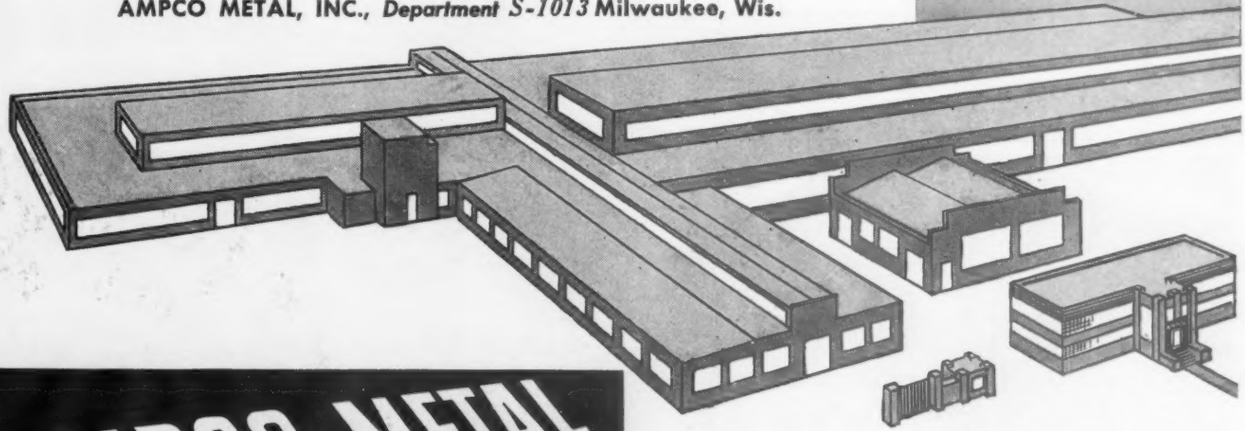
In the Tools and Weapons of Defense

Like hundreds of other plants, the Ampco foundries are all out for defense. Today 98.5% of the output is devoted to defense activities. Ampco Metal and Ampco-made bronzes are being used in aircraft, machine tools, ordnance, and other equipment where the sturdy, wear-resistant qualities of Ampco alloys are essential.

For years before the defense program was under way, Ampco was serving American industries, helping build the quality for which American products are famous. The high tensile strength, controlled hardness, and resistance to wear and corrosion of Ampco-made bronzes were early recognized by designing engineers as necessary for satisfactory equipment performance.

Catalog number 22—brand new—shows why Ampco Metal is preferred by defense contractors.

AMPCO METAL, INC., *Department S-1013* Milwaukee, Wis.



AMPCO METAL

The Metal Without An Equal

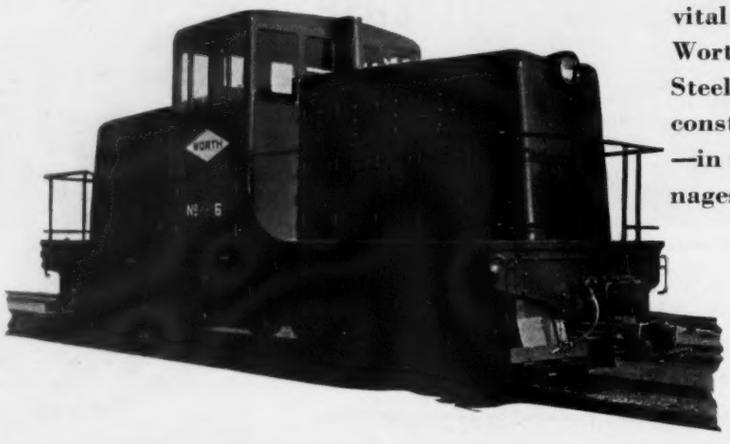
AMPCO

AMPCO FOUNDRIES—plant capacity has been doubled, making this the largest foundry in the country devoted primarily to the production of aluminum bronzes of controlled analyses.

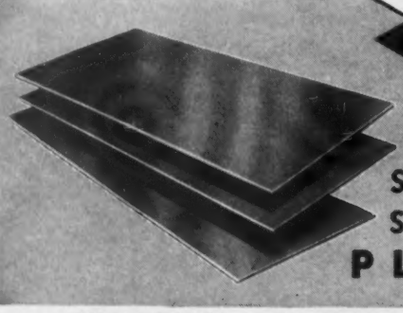
THOUSANDS Spent
For SECONDS Saved

● Scrapped are some of the donkey engines that puffed between Worth main line sidings and open hearths; open hearths and rolling mills, etc. New diesels now ply that route faster, more efficiently.

Fractional gain in production speed—yes—But to meet our problems and help you meet yours—not one, but dozens of these fractional gains have been made. And, to vital industries, Worth Sheared Steel Plates are constantly going—in volume tonnages.

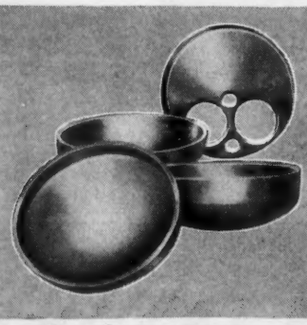


WORTH



SHEARED STEEL PLATE

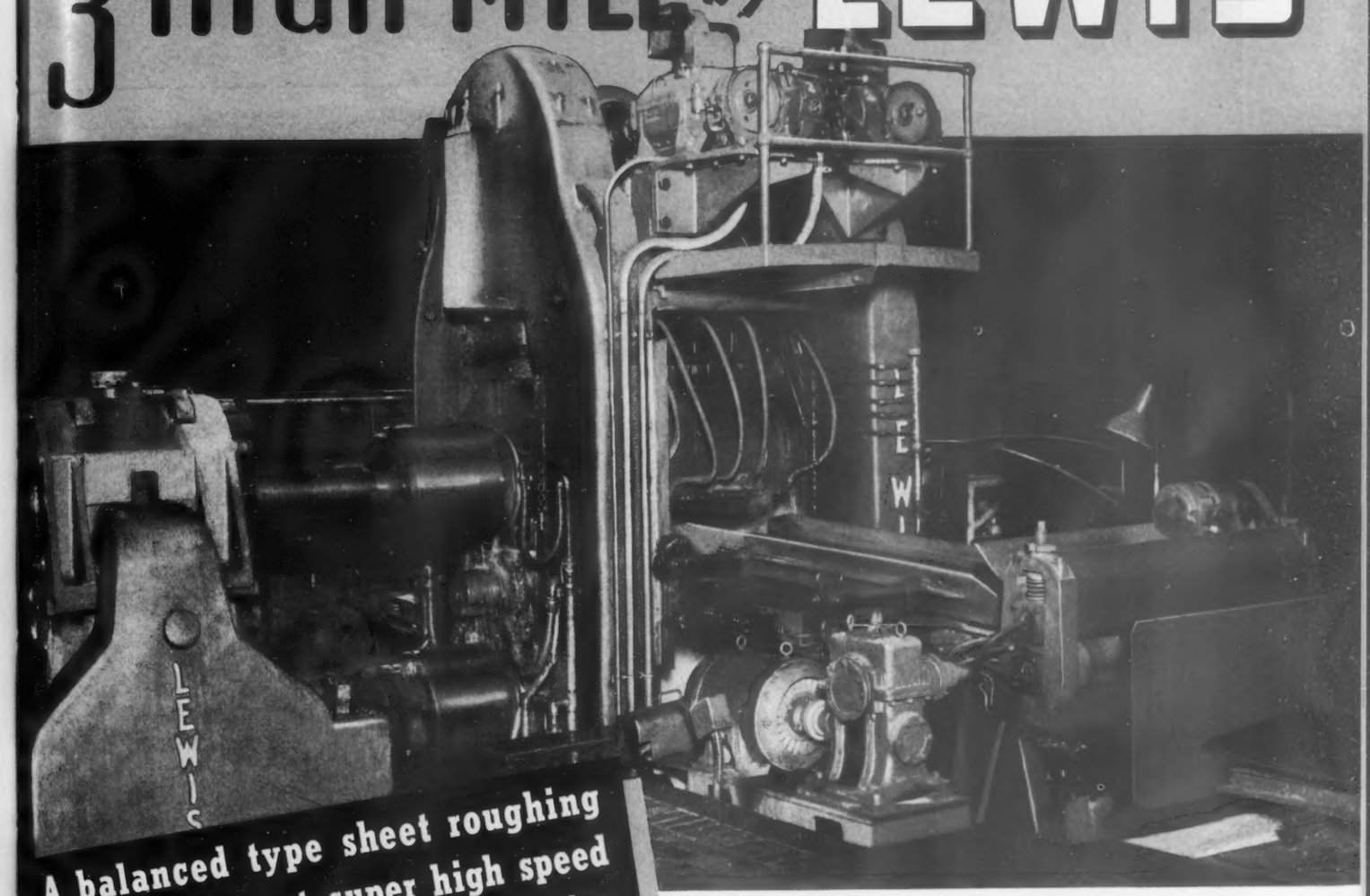
FLANGED and DISHED HEADS



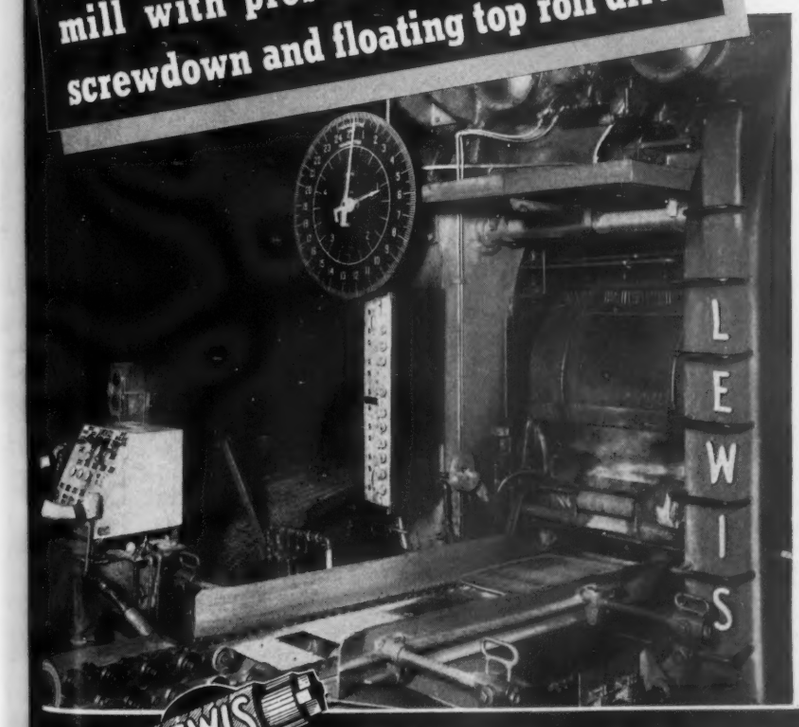
WORTH STEEL COMPANY • Claymont, Delaware

REPRESENTATIVES: New York, N. Y., Wm. C. Dickey • Pittsburgh, Pa., McKee-Oliver, Inc. • St. Louis, Mo., Hubbell & Co. • San Francisco, Calif., W. S. Hanford • Houston, Texas, The Corbett-Wallace Corp. • Cleveland, Ohio, E. F. Bond • Detroit, Mich., H. L. Sevin • Los Angeles, Calif., Ducommun Metals & Supply Co. • Seattle, Wash., Barde Steel Company • Portland, Oregon, Barde Steel Company • Montreal and Toronto, Canada, Drummond, McCall & Co., Ltd.

A NEW 3 HIGH MILL by LEWIS



A balanced type sheet roughing mill with preset super high speed screwdown and floating top roll drive



Special Features

It appreciably increases breakdown production of heavy sheet bar.

It is equipped with a floating top and bottom roll drive of new design.

No springs are used in balancing the top or middle roll, reducing maintenance costs.

Middle roll balance mechanism is incorporated in middle roll chocks, further reducing maintenance.

The floating type top roll drive eliminates jump in both top and bottom rolls.

This new mill is still another example of continued improvement and progress of Lewis Rolling Mill Machinery.

LEWIS FOUNDRY & MACHINE

DIVISION OF BLAW-KNOX CO.

PITTSBURGH, PA.

The

mettle

THAT MAKES MOST METAL SHOWS

Performing Metal—that's the substance of the stuff that goes into and evolves itself as LEE-BUILT SPRINGS. Metal of many analyses that fosters METTLE to the machine . . . the instrument . . . the device. While *all* spring products contain metal,

not all spring products *emit* mettle. Faulty design, improper materials and even inadequate production methods have all been traceable to a spring product that fatigues too early in service . . . That the springs you buy today, bearing the LEE trade name, possess the ultimate in service-giving qualities—LEE maintains an engineering and laboratory service directed exclusively toward customer satisfaction . . . Catalogs and special bulletins fully descriptive and illustrative of LEE SPRING PRODUCTS are available upon request, or, should you prefer—a special analysis and quotation on your individual problem.

LEE SPRING COMPANY, INC.
30 MAIN STREET BROOKLYN, N. Y.

Will see you at the Show!

ANODEX
FOR CLEANING
Machine Gun Parts and
Other Ferrous Metals

SOLVTEX
and Special Compounds
for Washing Machines

METEX
SHELL CASE COMPOUNDS
Recommended to be the most thorough compounds for cleaning brass shell cases of all types and calibers.

See what we do at Booth G46 National Metal Exposition, October 20-24 Philadelphia, Pa.

SPECIAL COMPOUNDS AND PROCESSES

There's no trick to MacDermid's special formulae. . . Just 22 years of hard work specializing in perfecting the correct compound and process for every cleaning problem.

Now, as never before, manufacturers are learning the importance of correctly cleaning basis metals prior to finishing or plating; and are turning to specialists for the answer to their problems. . . MacDermid has always thought in terms of results and has specialized in perfecting compounds and processes that will produce metallurgically clean basis metals. . . MacDermid processes are today recognized by many to be the fastest, most thorough, the most economical means of securing a uniformly bright adherent plate or finished product. . . MacDermid guarantees results with the right compounds—rightly used.

You will be amazed to see how easy it is to get metals metallurgically clean with MacDermid's special compounds and processes perfected to meet every finishing room need for the cleaning of basis metals. . . Have a MacDermid engineer prescribe the correct formula for your particular problem.

Compounds for Cleaning Metals

SALES AND SERVICE
from
COAST TO COAST
New York . . . Cleveland . . .
Los Angeles . . . Chicago . . .
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FINER, STRONGER PACKAGES

In keeping with our policy of constant improvement of product, we have also developed a better container. Of natural tan, virgin kraft board, reinforced, broad stitched, this package will stand constant rough handling. The label is not only handsome, but you can read with a minimum of effort just what is in the carton. Write for Catalog E and current discounts.

THE CLEVELAND CAP SCREW COMPANY, 2934 E. 79th St., Cleveland, Ohio

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SET SCREWS • BOLTS AND NUTS

Address the Factory or our Nearest Warehouse: Chicago, 726 W. Washington Blvd. • Philadelphia, 12th & Olive Streets
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BIG ONES

and little ones

(M-3 28-TON TANKS—BLITZ BUGGIES)

They're built of

N-A-X

High Tensile

(X9115)

DUCTILITY
ITS INHERENTLY FINER GRAIN
MAKES ALL THE DIFFERENCE
STRENGTH

. . . the low alloy steel with unusually high resistance

to **IMPACT** *and* **FATIGUE**

Manufacturers of M-3 tanks and the little Blitz Buggies did not reach in the air and pull out N-A-X HIGH TENSILE for these important defense applications. It wasn't just by chance that this superior low alloy steel was used for steel parts outside of armament on the tanks and the frames for the buggies. Long before the necessity for these units was urgent, N-A-X HIGH TENSILE had proved highly successful in hundreds of exacting applications, in many of which other comparable steels had failed.

With such a record behind it, it was natural for manufacturers and fabricators to use N-A-X HIGH TENSILE for defense applications. For it possessed properties which make it ideal for equipment so vital to the defense of America.

N-A-X HIGH TENSILE can be fabricated by all standard shop methods—it goes through each step in forming, welding, machining, smoothly, quickly, economically. And because of its outstanding properties, finished equipment—whether for defense or peace-time needs—has greater resistance to the destructive forces of *impact*, *stresses*, *shocks* and *fatigue*, over rough roads and terrain, in both extremely hot and sub-zero weather.

N-A-X HIGH TENSILE, also, has unusually high ductility, high yield point, high ultimate strength and marked resistance to both corrosion and abrasion—properties which make for speedier fabrication, low maintenance cost.

We shall be glad to furnish you additional information. A Great Lakes engineer will call at your convenience, show you how hundreds of others have used this remarkable low alloy steel to advantage in all kinds of applications. Wire telephone or write today for a Great Lakes engineer.

LIST OF PRODUCTS

Hot Rolled Strip (down to 1 inch wide) . . . Hot Rolled Strip Sheets (up to 91 inches wide) . . . Spring Steel (carbon and alloy) . . . Merchant Bars . . . Forging Bars . . . Automobile Bumper Sections . . . Bar Mill Sections . . . N-A-X HIGH TENSILE Bars, Shapes, Sheets, Billets . . . Sheet Bars . . . Hot and Cold Rolled Sheets . . . Michigan Metal for Vitreous Enameling . . . Deep Drawing Quality (in all grades, widths up to 91 inches) . . . Stran-Steel Metal Framing for Residential and Commercial Construction.

GREAT LAKES STEEL CORPORATION—DETROIT, MICHIGAN

Sales Offices in Principal Cities

division of NATIONAL STEEL CORPORATION

Executive Offices, Pittsburgh, Pa.

BAKER TRUCKS are vital to industrial production

● As war needs are again challenging the productive capacity of America, Baker trucks are recognized as essential equipment by government agencies. The Baker plant — its own productive capacity greatly expanded — is operating night and day to meet the vital requirements of the Army and Navy, government arsenals and private corporations striving for maximum output of defense materials.

Baker Trucks, now on the Priorities Critical List of the O. P. M., belong on the "critical list" of every manufacturer faced with material handling bottlenecks — in peace or war. If you are seeking maximum productive efficiency from limited floor-space, machinery and man power, a Baker representative can probably suggest a solution.

BAKER INDUSTRIAL TRUCK DIVISION

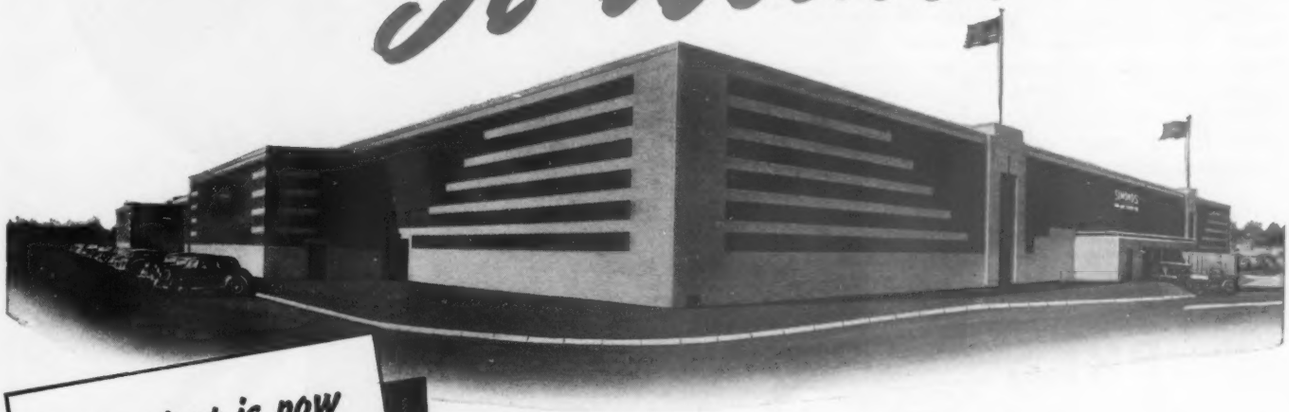
The Baker Raulang Company • 2167 West 25th Street, Cleveland, Ohio

Trade mark Registered U. S. Pat. Off.

Baker INDUSTRIAL TRUCKS

in Canada: Railway and Power Engineering Corporation, Ltd.

2 YEARS' EXPERIENCE IN OUR CONTROLLED-CONDITIONS PLANT PROVES: *"It Works!"*



This plant is now helping to Speed Defense Work... by producing Wood and Metal-Cutting Tools under ideal working conditions... 24 hours a day

In the single 5-acre room of the world's first windowless plant, seven straight production lines are rolling at top speed, working 24 hours a day in weather that is always fair . . . invigorating, constantly controlled weather that makes it possible to hold output and quality on a higher level than ever before. And from this permanently blacked-out building comes a steady stream of Simonds Tools to help speed industry's work for defense from aircraft plants to army camps . . . Simonds Band and Circular Saws for cutting Metal and Wood, Red Tang Files, Red End Hacksaws, Machine Knives, Shear Blades, Tool Bits. Yes, the Simonds plant is working "all right" . . . *in fact, it's working as few plants can.*

SIMONDS SAW AND STEEL CO., FITCHBURG, MASS.

SIMONDS

FAMOUS FAMILY OF METAL CUTTING TOOLS

CIRCULAR & BAND SAWS • SHEAR BLADES • RED TANG FILES • RED END HACKSAWS • TOOL BITS

LOOKING BEYOND
THE PRESENT CRISIS - -

ADAPTABILITY

WILL PROTECT
YOUR INVESTMENT

The wise buyer of tools for the present defense program will bear in mind the efficiency and economy with which these tools can be adapted to other applications in later adjustment to peace-time production. FERRACUTE PUNCHING PRESSES are speedily and easily adaptable for a great variety of uses—either before installation or after years of use.

FERRACUTE PUNCHING PRESS

4-point adaptability

1 The FERRACUTE system of a separate eccentric keyed on to the taper part of the shaft not only assures greater strength but makes it easily possible to change the stroke when new, or afterward, by simply substituting other eccentrics.

2 Quick changes of dies due to a simple clamping device—particularly valuable for short production.

3 Quick and easy adjustment for varying die heights.

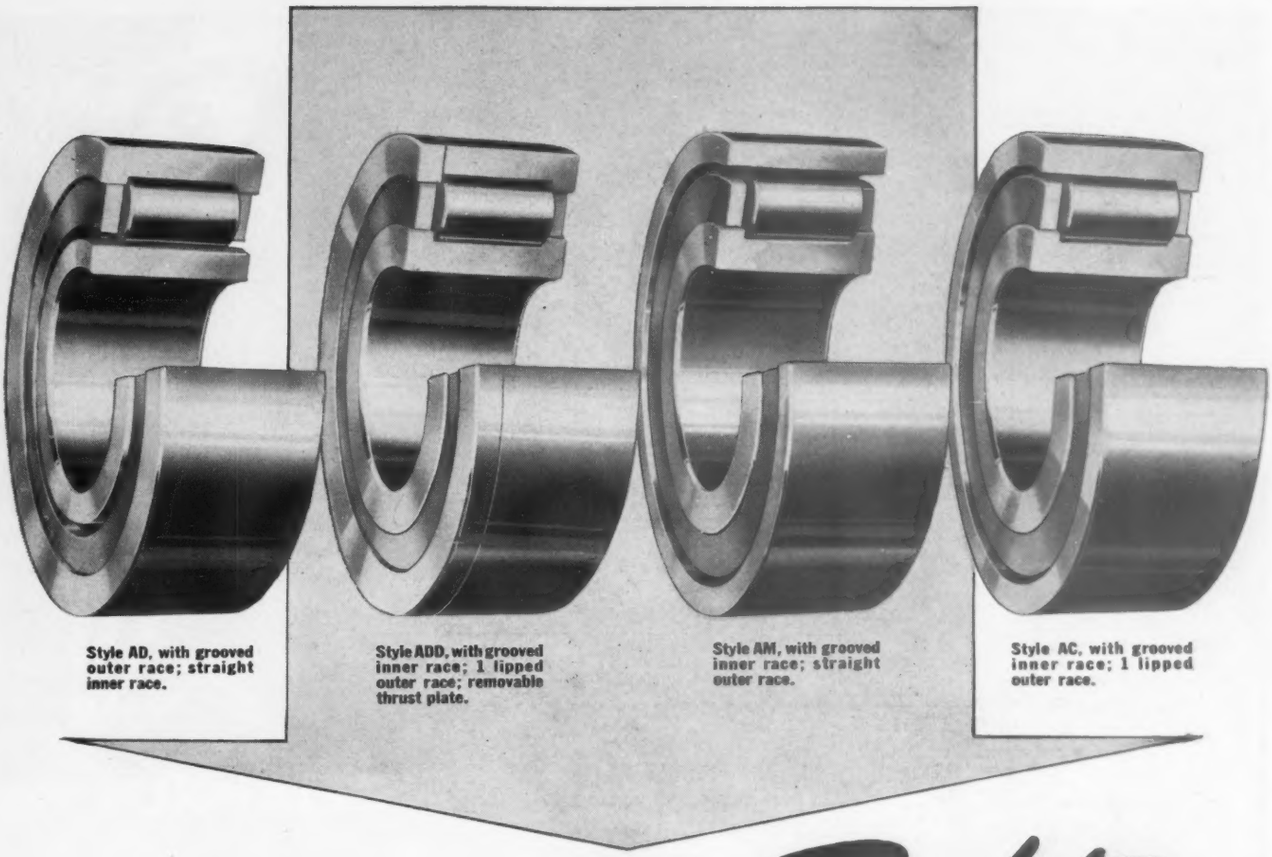
4 Adaptability to any type of motor drive.

Extremely **RIGID** *frame with* **HEAVY** *internal ribs*

TRADE FERRACUTE MARK

FERRACUTE MACHINE COMPANY

BRIDGETON, NEW JERSEY, U. S. A.


Style AD, with grooved outer race; straight inner race.
Style ADD, with grooved inner race; 1 lipped outer race; removable thrust plate.
Style AM, with grooved inner race; straight outer race.
Style AC, with grooved inner race; 1 lipped outer race.

Completely Right for Radial Loads!

Now you can have the superior performance of AMERICAN RADIAL ROLLER BEARINGS for almost every heavy-duty bearing application where the load is radial. Through popular demand for a wider range of these adaptable, reliable, durable bearings, AMERICAN has extended its RADIAL line to include 5 styles, 4 S. A. E. series and a total of 85 sizes! Supplementing these, special designs to order are also available. AMERICAN thus becomes a single dependable source for a COMPLETE line of Radial Bearings. Each is a leader in its class . . . designed to meet exacting engineering requirements and to function flawlessly in service under the most rigorous conditions. Write for specifications or send us your requirements for analysis and recommendations.

AMERICAN ROLLER BEARING CO.
PITTSBURGH PENNSYLVANIA
Pacific Coast Office: 1718 S. Flower St., Los Angeles, Calif.

AMERICAN *HEAVY DUTY* ROLLER BEARINGS

Steel Conserved by Preformed Wire Rope would build 2,095 Anti-Aircraft Guns

★ Each year American industry uses more preformed wire rope because it saves money by lasting longer, and saves time through fewer machine shutdowns for replacements. Operating men like it because it steadies production and increases safety.

★ Now all of a sudden, for another reason, preformed is tremendously important—because wire rope that lasts longer *conserves steel which America greatly needs.*

★ For example, the steel conserved this year by the longer service of preformed wire rope will be enough to build 2,095 anti-aircraft guns.

★ Buying and using preformed wire rope is patriotism industrialized.

PREFORMED WIRE ROPE

Ask Your Own Wire Rope Manufacturer or Supplier

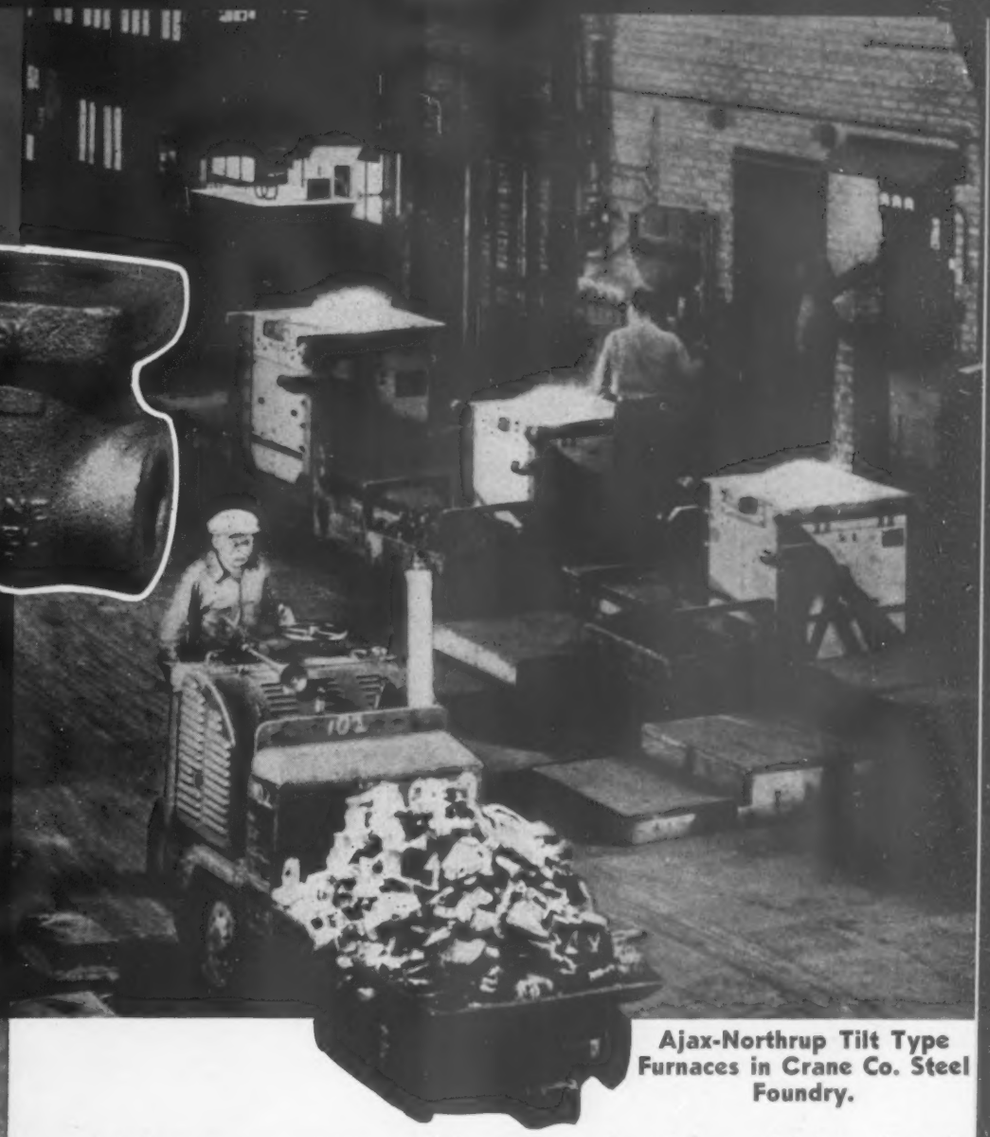
CRANE STEEL VALVE CASTINGS—

600 LB. MELTS
—40 Minutes

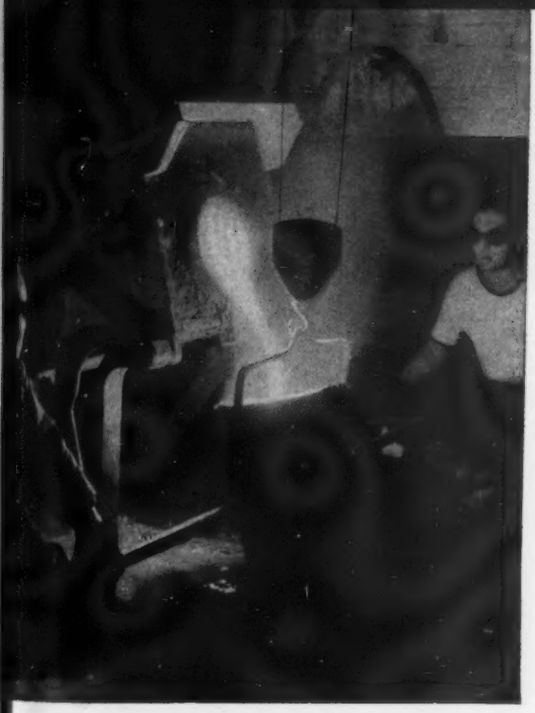
2000 LB. MELTS
—2 hrs., 10 Minutes

with

AJAX-NORTHRUP INDUCTION FURNACES



Ajax-Northrup Tilt Type Furnaces in Crane Co. Steel Foundry.



Modern steam pressures call for a strength and dependability of steel castings unheard of a few years ago. Crane Co., of Chicago, uses the AJAX-NORTHRUP Furnace for this purpose and reports the following advantages:

The metal must be poured at 3000 to 3300 degrees F. from lip poured ladles.

Because of the many varying specifications, small melts are the rule rather than the exception.

Exacting analyses can be made repeatedly with precision.

Production schedules can be met in spite of the very special nature of the work.

Crane Co. regularly manufactures 45 nonferrous and 12 ferrous alloys for use in its various manufacturing processes. Here AJAX-NORTHRUP Furnaces are also used extensively because of their flexibility and precision control and because laboratory developments can be transferred to large-scale factory production with larger AJAX-NORTHRUP Furnaces with predetermined results.

K FOR THE AJAX-NORTHRUP BULLETINS

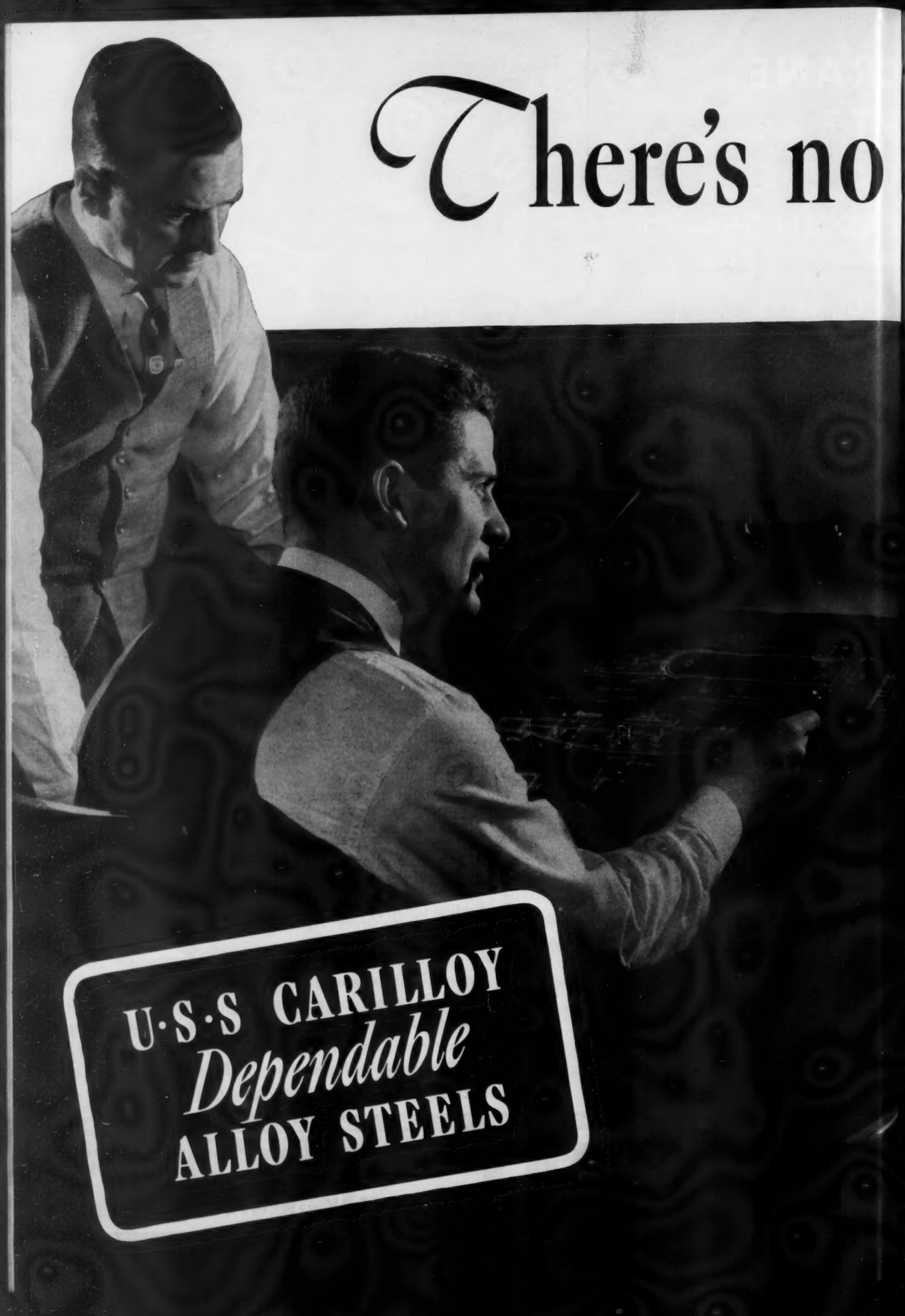
SEE AJAX AT THE METAL EXPOSITION—BOOTH No. 211 AJ 33A

AJAX-NORTHRUP MELTING FURNACE CAPACITIES: ONE OUNCE TO EIGHT TONS

AJAX ELECTROTHERMIC CORPORATION

AJAX PARK · TRENTON · NEW JERSEY

ASSOCIATE **THE AJAX METAL CO.,** *Non-Ferrous Ingot Metal for foundry use.*
AJAX ELECTRIC FURNACE CORPORATION, *Ajax-Wyatt Induction Furnaces for melting.*


There's no
U·S·S CARILLOY
Dependable
ALLOY STEELS

priority on ideas!

Here's a service we can give you right now . . . Expert advice in using your present facilities to best advantage

THE specialized knowledge of our metallurgical contact staff can be of help to you at the present time.

These men are in intimate touch with the rapidly and constantly changing steel picture. They know alloy steels. For years they have worked shoulder to shoulder with men in machine shops, forge plants, and in heat-treating departments and welding shops, digging out the hard facts that make production flow smoothly.

Right now when a new resourcefulness is urgently needed to meet an increasing scarcity of materials, skilled labor and tools, we urge you to draw freely upon this rich reservoir of experience.

If your alloy steel set-up calls for a re-examination and re-orientation, if a revision of your shop practices will expedite production, or if re-design of your product is necessary, the practical advice and guidance these men can bring to your job will help you do it with least waste, trouble and delay.

This service is not new. It was initiated long before the present situation developed. It is seasoned, tried and thoroughly competent. It is offered freely—and it is *immediately* available.

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

USS

UNITED STATES STEEL

A.G.M.A. moves to assist ★ National Defense

You can help

Facing today's problems, every Defense buyer wants to save time in buying and get deliveries as quickly as possible. Recognizing this urgent need, individual members of the American Gear Manufacturers Association are concentrating gearmotor production on the recommended standard speed combinations as adopted by AGMA and approved by the National Electrical Manufacturers Association, as shown in the paneled list to the right. Adopting these speeds as YOUR standards will expedite shipments, save valuable time in buying, and get results faster.

American Gear Manufacturers Assn.
Shields Building
Wilkinsburg, Pa.

AGMA

AMERICAN GEAR MANUFACTURERS ASSOCIATION

★

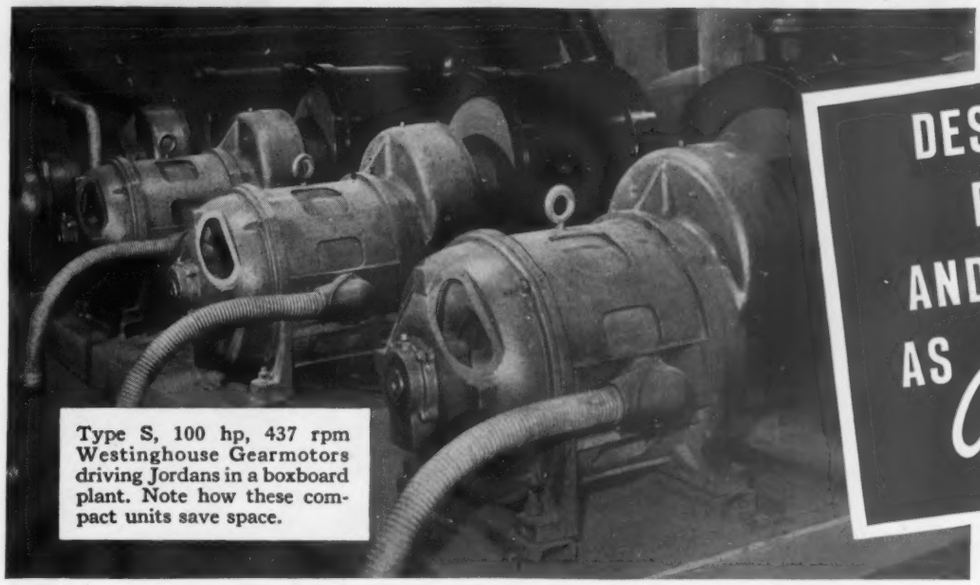
A.G.M.A. STANDARD OUTPUT SPEEDS

STANDARD OUTPUT SPEEDS for concentric and parallel shaft integral hp Gearmotors. Based on 1750, 1430 or 1165 rpm motor operating speeds.

1430	190	25
1170	155	20
950	125	16.5
780	100	13.5
640	84	11.0
520	68	9.0
420	56	7.5
350	45	6.0
280	37	5.0
230	30	4.0

AGMA

WESTINGHOUSE GEARMOTORS



Type S, 100 hp, 437 rpm Westinghouse Gearmotors driving Jordans in a boxboard plant. Note how these compact units save space.

DESIGNED, BUILT AND TESTED AS *Complete* UNITS

HIGH-SPEED MOTOR EFFICIENCY FOR SLOW-SPEED DRIVES

Westinghouse engineers have made it easy to select an efficient stock slow-speed drive and get maximum performance for all types of applications. With a Westinghouse Gearmotor trouble-free service and low maintenance is assured because Westinghouse Gearmotors are *designed*, *built*, and *tested* as complete units.

Gears, accurately cut from forged steel and heat-treated by the exclusive Westinghouse BPT process, are matched to all other parts and built in as an integral part of the machine.

The high degree of accuracy followed in the construction of individual parts and the careful matching of these parts to form a single compact unit makes it possible for Westinghouse to provide a slow output speed at 94% to 98% efficiency.

Westinghouse Gearmotors are available in all standard motor ratings and a wide variety of special enclosures. Compact and easy to install, they will solve many of your slow-speed drive problems. For complete details, see your Westinghouse representative.

★

A.G.M.A. STANDARD OUTPUT SPEEDS

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1430	190	25
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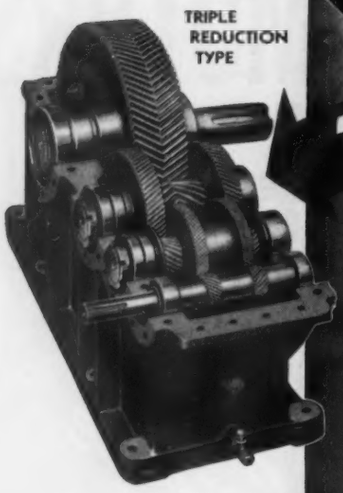
280	37	5.0
230	30	4.0

AGMA

WESTINGHOUSE ELECTRIC & MFG. CO.
EAST PITTSBURGH, PA.

J-07169-A

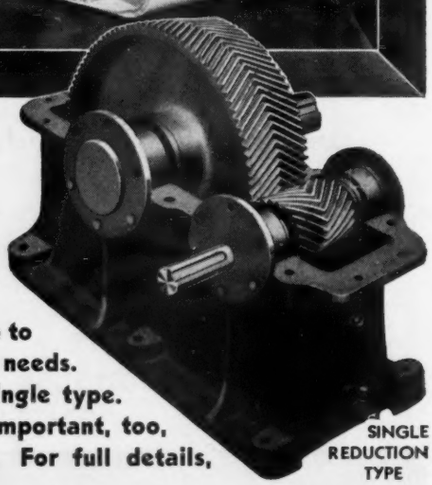
Westinghouse
GEARED DRIVES



TRIPLE REDUCTION TYPE

1-2-3

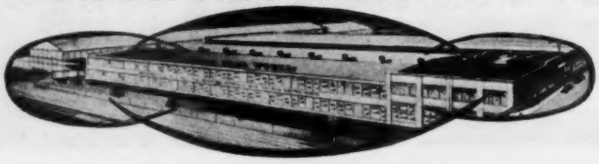
Philadelphia LIMITORQUE CONTROL operates all types of valves, etc., safely, economically, from convenient stations.
Philadelphia WORM GEAR SPEED REDUCER right angle drives—vertical or horizontal. Wide range of ratios and horsepowers.
Philadelphia HERRINGBONE SPEED REDUCER for heavy loads at high speed. Single, Double, Triple Reductions, various ratios and horsepowers.
Philadelphia MOTOREDUCER The economical self-contained drive. Horizontal or Vertical types—various ratios and horsepowers.
Philadelphia GEARS All types and sizes of industrial gears. Can be supplied in all materials.



SINGLE REDUCTION TYPE

Where you have to transmit heavy loads at high speeds or where shock is a constant factor, investigate Philadelphia Herringbone Speed Reducers before you decide on the drive. These units, made in single, double and triple reduction types can be supplied for ratios from 1.75 to 1 up to 300 to 1 and in horsepowers to fit your needs. Efficiencies are high, up to 98% on the single type. Their trouble-free performance is mighty important, too, in these days of speeded-up production. For full details, write

PHILADELPHIA GEAR WORKS



Industrial Gears and Speed Reducers
Erie Ave. and G St.
Philadelphia, Pa.
•
New York • Pittsburgh • Chicago

HELP DEFENSE WORK
Keep Motors On The Job
with

TRADE MARK REGISTERED
NON-FLUID OIL
IN U.S. PAT. OFFICE & FOREIGN COUNTRIES

Today you can't afford to have even one motor out of service because of a short-circuit — due to dripping, leaking oil, resulting in burned out windings.

You'll avoid this trouble by using NON-FLUID OIL which stays in bearings until entirely consumed, outlasting oil 3 to 5 times.

Cost of lubrication is less, repairs are most infrequent — and you prevent costly interruptions to production.

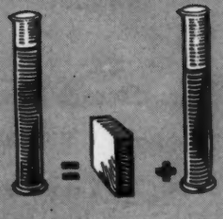
Used successfully in leading iron and steel mills.
Send for testing sample today—prepaid—NO CHARGE

NEW YORK & NEW JERSEY LUBRICANT CO.
292 MADISON AVENUE NEW YORK
Works: NEWARK, N. J.

WAREHOUSES: Charlotte, N. C. Greenville, S. C. Atlanta, Ga.
Providence, R. I. Detroit, Mich. Chicago, Ill. St. Louis, Mo.

. . . GREASE

Just as a sponge controls the water it has absorbed, so is soap a thickening agent which controls the flow of the lubricant to the bearings.



Maximum economical lubrication per pound of grease is assured by the use of cylinder oil, making a minimum of soap necessary.

USED TO DRIP

LIKE A CANDLE IN THE BREEZE

until a switch was made to TYCOL GREEN CAST GREASE

This manufacturer had been experiencing numerous difficulties with the grease previously used on his centrifugal boiler pumps and the bearings on his chain stokers. On the advice of a Tide Water engineer they switched to Tycol Green Cast Grease. Since then the nuisance of having to keep an eye on the grease job and cleaning up the mess of drippings has been eliminated. Now they just put in Tycol Green Cast Grease and forget it. One less item to worry about—the grease stays put and does an economical and dependable job of lubricating. » » » Tycol Green Cast Grease can effect economies in your plant too. Its high lubricating quality and long trouble-free life are the result of years of extensive research by Tide Water engineers in their continuous efforts to develop "the correct lubricant for any and every industrial job."

Let a Tide Water engineer show you where economies can be made in your lubrication. Write the Tide Water Associated Oil Company, 17 Battery Place, New York, N. Y. Assistance is freely offered.

Regional Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

TIDE WATER ASSOCIATED OIL COMPANY

EASTERN DIVISION

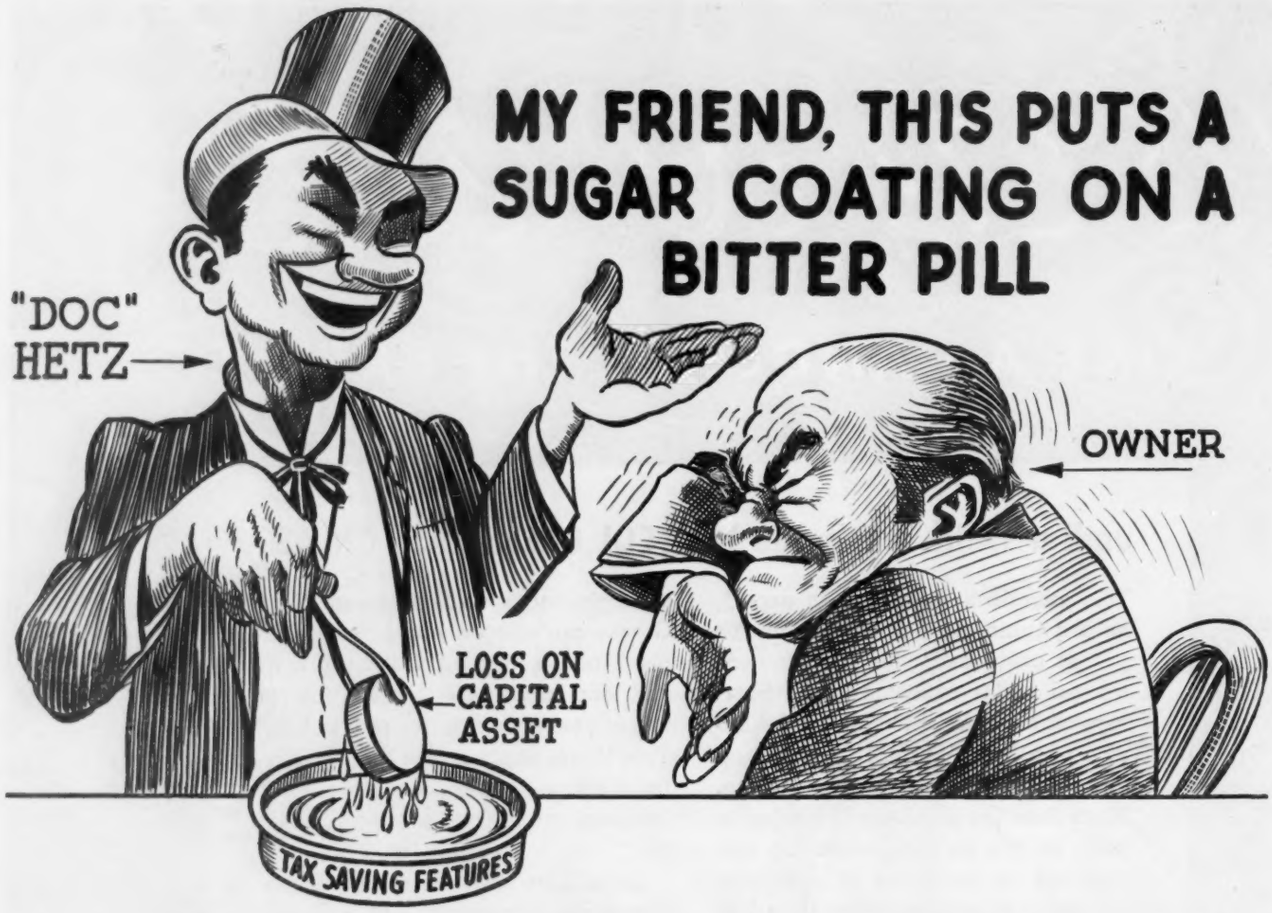
17 Battery Place • New York, N. Y.

Veedol Motor Oil is another well-known product of the Tide Water Associated Oil Company.

INDUSTRIAL TYCOL OILS-GREASES

Tycol Green Cast Greases are made of paraffine stock cylinder oil which has high flash and fire points, with maximum film strength.

TIDE WATER Green Cast GREASE



THE PRESENT CONFISCATORY TAX REGULATIONS ARE SO SEVERE THAT EVERY ADVANTAGE MUST BE TAKEN OF THE FEW PROVISIONS FAVORABLE TO THE TAX PAYER. FOR EXAMPLE:

Only two months remain in which to take a liquidating loss of a capital asset for the year 1941.

You may never have a better opportunity to replace assets of doubtful nature with real cash that can be used for an emergency, or re-invested in profit-earning channels.

Only two months remain if you want to avoid 1942 real estate taxes on any unprofitable units.

When the present hectic days are over, and you are faced with the problem of adjusting yourself to a new set of conditions, don't be crippled by having carried questionable assets such as unproductive units. Prudence suggests taking the loss when you can afford it, and thereby keeping yourself as nearly as possible 100% liquid.

Let us Have Your Plant Before it's a Wreck and it May not Have to be Wrecked

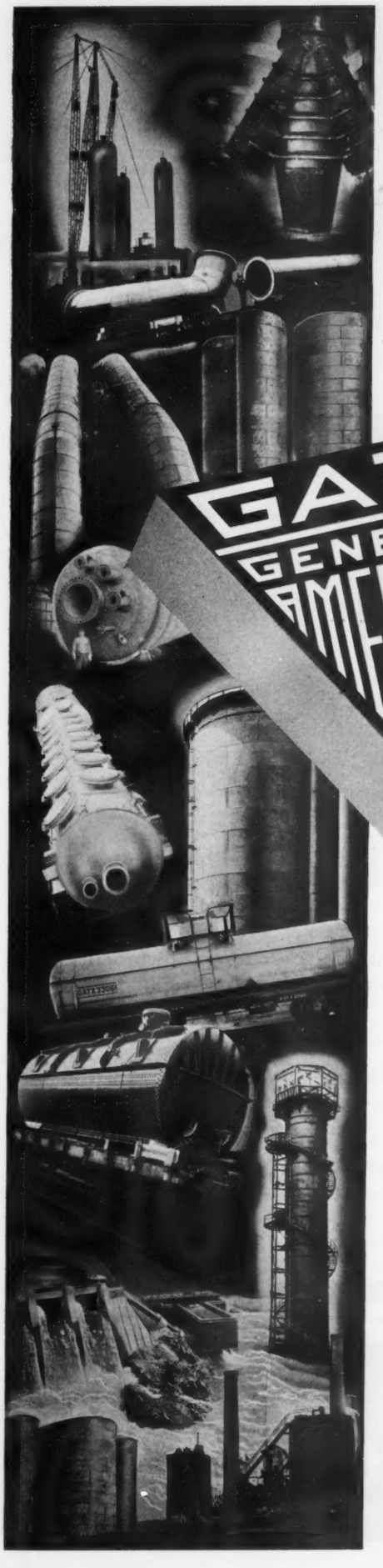
HETZ CONSTRUCTION CO., INC.

CONFIDENTIAL INSPECTION AND PROPOSALS MADE WITHOUT OBLIGATION

World's Largest Purchaser of Industrial Misfits

W A R R E N , O H I O

COMPREHENSIVE LIQUIDATION SERVICE—BUILDINGS, LAND, EQUIPMENT, MATERIALS



CHECK YOUR REQUIREMENTS FOR . . .

PRESSURE VESSELS
CAR AND TRUCK TANKS
FRACTIONATING COLUMNS
STILLS
STORAGE TANKS
STANDPIPES
PENSTOCKS
ROTARY KILN SHELLS
WELDED OR RIVETED PIPE
SMOKESTACKS
BLAST FURNACES

. . . in fact, any class of light or heavy STEEL PLATE CONSTRUCTION . . . . for OIL REFINING, CHEMICAL PROCESSING, STEEL MILLS, etc.

GATX
GENERAL AMERICAN

PLATE & WELDING DIVISION
PLANT AT SHARON, PA.

Check G.A. Resources Because...

In experience, equipment and manpower, the Plate & Welding Division of General American Transportation Corporation offers you unusual advantages.

Here 49 years of steel-plate specialization are backed by the vast resources of General American. You are assured of the highly individualized service of a select organization, plus adequate capacity to handle any job, of any size.

Our complete facilities include a large modern Plate Shop, Fusion Welding Plant, completely equipped Testing and Chemical Laboratories, and an Advisory Engineering and Designing Staff second to none. Write, wire or phone your inquiries.

"FLUID FUSION" WELDED VESSELS are made exclusively by:

PLATE & WELDING DIVISION
GENERAL AMERICAN TRANSPORTATION CORP.

Successor to Plate & Welding Div., Petroleum Iron Works Co. (P.I.W.)

PLANT AT SHARON, PA. ★ OFFICES IN ALL PRINCIPAL CITIES

For Defense and for Normal Industry

MANY FINISHING PROBLEMS HAVE BEEN SOLVED HERE!

Can we help you?

Out of the Parker Research Laboratories have come the solution to the most difficult finishing problems that have perplexed executives of some of America's giant industries.

Banishing rust from our automobiles, trucks, refrigerators, electrical equipment, office machines, and scores of other products is the result of their efforts. Now they are showing the way to effective protection of material for defense.

Showing the way to the conservation of strategic metals for defense purposes is the present most important purpose of this organization. Fitting Parker Processes to take the places of zinc, tin, cadmium and chromium —releasing these metals for vital defense needs—is the appointed task of the Parker Laboratories.

They are already successful in many industries. If you have a finishing problem, pass it on to this group of chemical engineers.

PARKER RUST PROOF COMPANY
2158 E. Milwaukee Ave. • Detroit, Michigan

PARKERIZING
A finish and substantial protection from rust on bolts, screws and small mechanical parts.

BONDERIZING
A rust inhibiting paint base that bonds the finish to sheet metal surfaces.

PARCO LUBRIZING
A chemically produced coating for friction surfaces that retains oil and prevents metal to metal contact.

PARKER *Processes* CONQUER RUST
BONDERIZING · PARKERIZING · PARCO LUBRIZING

COLD FINISHED STEELS *helped* **BRING YOU THE** *"STREAMLINERS"*

One hundred miles per hour by rail . . . 200 M.P.H. cruising speeds in the air . . . 30 knots by sea . . . 40 M.P.H. road average by truck. Such is the speed and mechanical efficiency developed by modern modes of transportation . . . thanks to steel, and in many vital ways . . . Cold Finished Steel. Of all metals useful to man, steel is by far the most versatile and economical. Among steels, the true precision steel is Cold Finished Steel . . . utilized wherever wear, strength, heat, high torque and maximum precision control vital working parts.

WYCKOFF Cold Drawn Steels have long been recognized as *precision steels* of unlimited integrity and have taken their rightful place, along with other fine steels, in the development of modern transportation. Today, much of Wyckoff's production is required for the infinitely precise working parts of mechanized armament, where it again gallantly joins services with other excellent steels to help insure a sound defense.

When industry again turns from preparation for war, Wyckoff Cold Finished Steels will continue their vital role in the development of a better everyday living for the American people through continuous progress.

DRAWN FROM *Controlled* STEEL
COLD FINISHED STEEL
WYCKOFF

WYCKOFF DRAWN STEEL COMPANY

First National Bank Bldg., Pittsburgh, Pa. · 3200 So. Kedzie Ave., Chicago, Ill.

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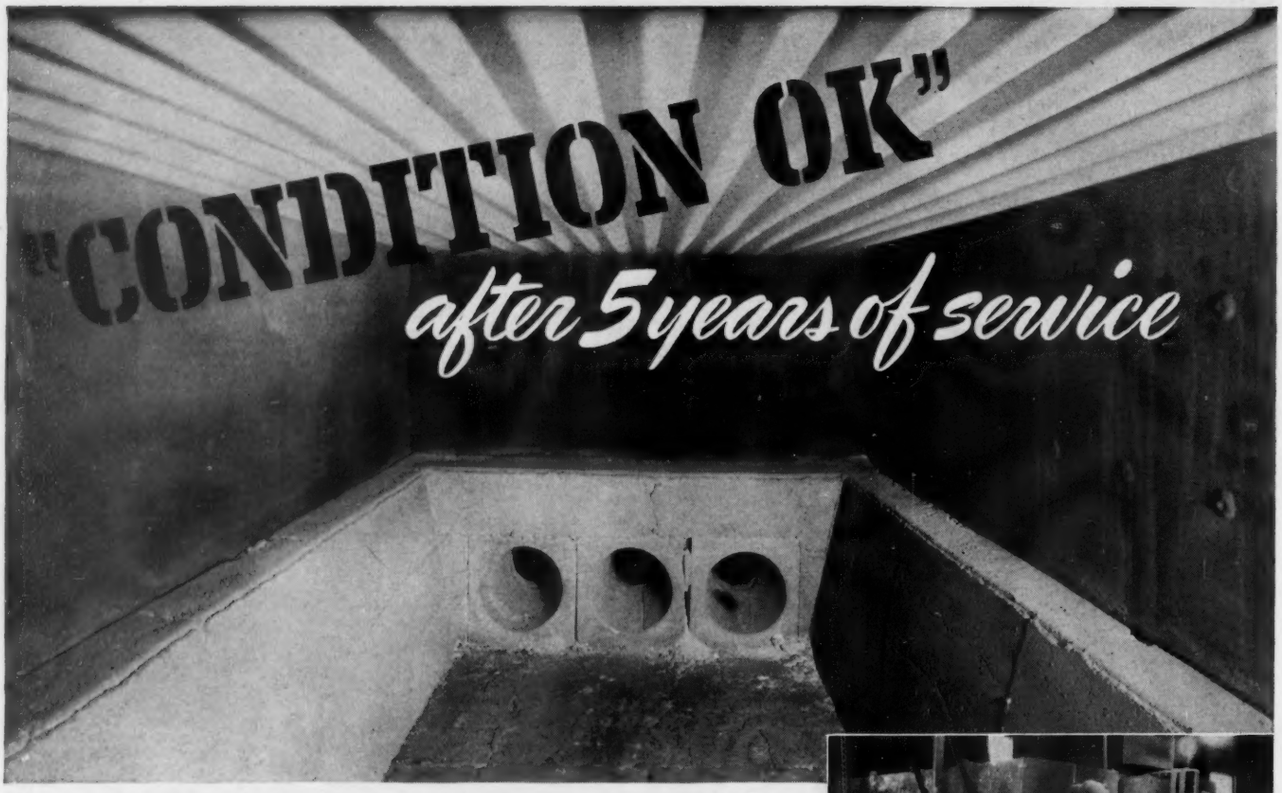
Manufacturers of Carbon and Alloy Steels . . . Leaded Steels . . . Turned and Polished Shafting . . . Turned and Ground Shafting . . . Wide Flats up to 12 inches by 2 inches



Combustion chamber and burner ports of Refractory Concrete, made with LUMNITE. Chamber is 15 ft. long, 9 ft. wide, 6 ft. high. One of 3 installations in gas-fired boilers of R. Herschel Mfg. Co., East Peoria, Ill.

Refractory Concrete, made with LUMNITE, writes a notable record of savings and service for the R. Herschel Manufacturing Company

THE picture above shows the combustion chamber and burner ports of one of three gas-fired boilers installed at this East Peoria, Illinois, plant. Refractory Concrete, made with LUMNITE, has been in service for over five years and is still in excellent condition.

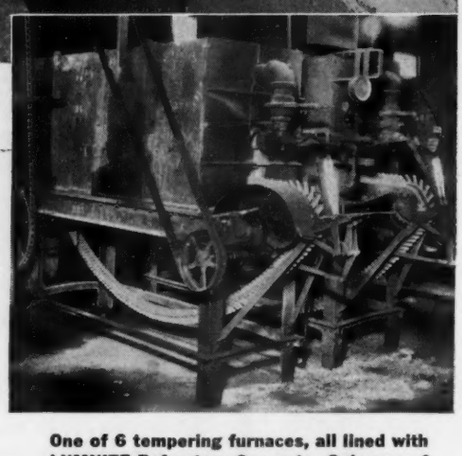
Ten years ago the Herschel Company used its first Refractory Concrete in small furnaces. Economy in first cost and low maintenance figures led to installation after installation. And you hear reports like these: "Saved 50% on refractories" . . . "Forge furnace for blacksmith shop built at ½ usual refractory cost" . . . ."40% saved on first cost plus greater service life."

Here are some of the Refractory Concrete installations in the Herschel Company plant today:

1. Combustion chamber and burner ports in 3 gas-fired boilers.
2. Parabolic curved roof arch, walls and hearth in 6 gas-fired tempering furnaces.
3. Hearth, walls and roof arch of blacksmith shop heating furnace.
4. Slabs for well-type blacksmith heating furnace.
5. Variety of special precast shapes.

This story of the successful use of Refractory Concrete, made with LUMNITE, is only one of many. There are 7 good reasons why you will find it efficient and economical.

You can get LUMNITE from dealers all over the country—and in Canada. Send for detailed information in the booklet, "Refractory Concrete." Atlas Lumnite Cement Company (United States Steel Corp. Subsidiary), Dept. S-19, Chrysler Bldg., New York City.



One of 6 tempering furnaces, all lined with LUMNITE Refractory Concrete. Only one of many uses of this refractory by R. Herschel Manufacturing Company.

Lumnite Castables

• • •

Here's a quick, easy way to make Refractory Concrete for many jobs. Get factory-prepared mixtures of LUMNITE and selected aggregate, and just add water. These LUMNITE Castables are obtainable from refractory manufacturers and their distributors. They have the regular properties of Refractory Concrete—quick-hardening, high cold strength, sustained strength in service.

Specify Castables "Made with LUMNITE"

LUMNITE FOR REFRACTORY CONCRETE

SEMS FASTENER UNITS

.Reg. U. S. Pat. Off.

speed up assembly and protect performance for SCHICK SHAVERS

In the assembly of the nationally famous Schick Shavers, manufactured by Schick Incorporated of Stamford, Connecticut, great care is taken to have all parts fastened securely and thoroughly protected against vibration. The illustration above shows the "whisk-it"—the part that catches the beard clippings—being fastened with SEMS Units. The operator quickly picks up the single unit and drives it home. No time wasted putting the lock washer on the screw—no chance to "forget" the lock washer which keeps the screw locked tight. Take advantage of this assembly efficiency and product protection which SEMS Fastener Units provide—write for testing samples today!

Lock Washer can't come off . . . but is free to rotate!

View of one part of two Schick Shaver assembly lines on which SEMS Fastener Units are used.

Operator completing attachment of the "whisk-it" to the Schick Shaver.

New **SHAKEPROOF CATALOG**

See Next Page

NEW FASTENING DATA BOOK!

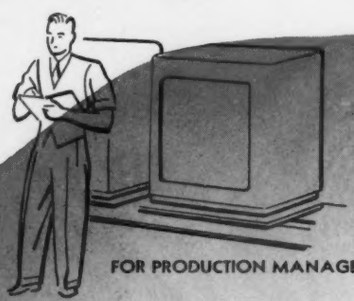
A Guide to Better Fastenings!

Shakeproof Products offer definite assembly and performance features that help to lower costs and improve quality. This new data book shows you how to take advantage of these better fastenings and achieve greater production efficiency.

FOR PURCHASING EXECUTIVES

FOR DESIGN ENGINEERS

READY SOON... RESERVE YOUR COPY NOW!



FOR PRODUCTION MANAGERS

THE new Shakeproof Catalog No. 42 provides a complete and detailed presentation of all Shakeproof Products. Its one hundred and forty pages are filled with information and illustrations of special interest for design engineers, production managers and purchasing executives. Each Shakeproof product is described in detail and full engineering data is given. In addition, application suggestions and other technical material helpful in securing greater fastening efficiency has been included. Reserve your copy of this outstanding fastening data book by mailing a request on your company's stationery—copies will be distributed as soon as available.

SHAKEPROOF inc.

fastening Headquarters

Distributor of Shakeproof Products Manufactured by ILLINOIS TOOL WORKS

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Foreign Licensees: Barber and Colman, Ltd., Brooklands, Manchester, England
Carr Fastener Co. of Australia, Ltd., Royal Park, South Australia

SEMS Fastener Units • Lock Washers • Locking and Plain Terminals • Thread-Cutting Screws • Locking Screws • Spring Washers • Radio and Instrument Gears • Engineered Shakeproof Parts • Special Stampings

WHITCOMB

LOCOMOTIVES

CONSTANT ECONOMICAL SERVICE

Step by step, during the past thirty five years, Whitcomb designers of mobile power units have built an enviable reputation in the industrial locomotive field. Aware of the problems confronting those responsible for moving materials in a hurry; they have provided the answer. The WHITCOMB locomotive has power far above its rated capacity; it bears up under punishing work for long hours at very low operating and maintenance costs, and is enthusiastically recommended by the management of every plant that owns one. This enthusiasm is based on hard-headed materialism: it is prompted by the long life, sturdy construction, low maintenance and efficient operation of the WHITCOMB locomotive.

DIESEL or GASOLINE POWER — MECHANICAL, HYDRAULIC, or ELECTRIC DRIVE

BLW
THE BALDWIN GROUP

THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE, ILL.

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

to hold

down

costs . . . and

still keep pace with orders

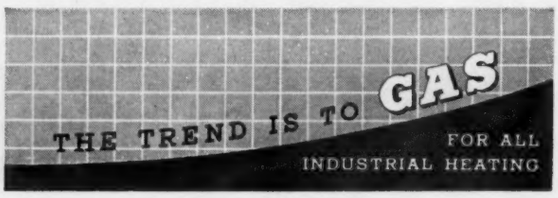
GAS and modern GAS EQUIPMENT can help you as they today help hundreds of other industries

If you are working against time in your plant . . . if you must step up production quickly, maintain it indefinitely and still hew to the line in product quality and uniformity while keeping unit costs down . . . it will pay you to investigate today's high efficiencies of Gas and modern Gas equipment.

Gas meets all the requirements of a high speed, modern industrial fuel. It is quick heating, clean, flexible, economical, and can be accurately and automatically controlled for precision manufacture. Furthermore, new and improved Gas equipment now available brings about new efficiencies and new economies in the use of this modern fuel.

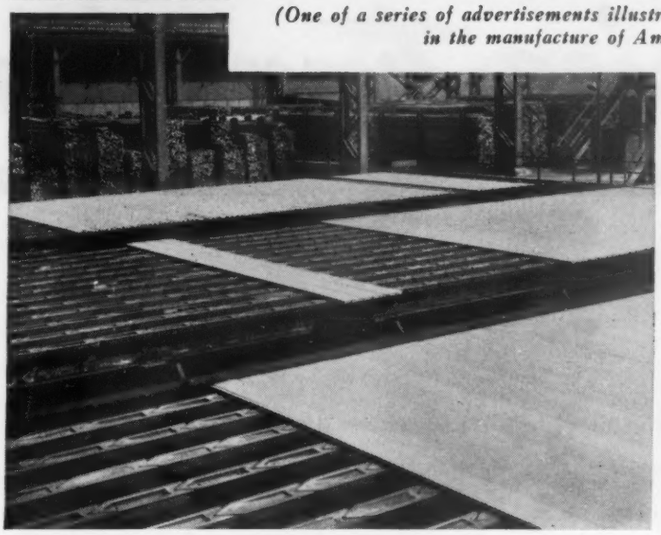
Your Gas company will be glad to consult with you on any industrial heating problem. No obligation.

AMERICAN GAS ASSOCIATION
INDUSTRIAL and COMMERCIAL GAS SECTION
420 LEXINGTON AVE., NEW YORK



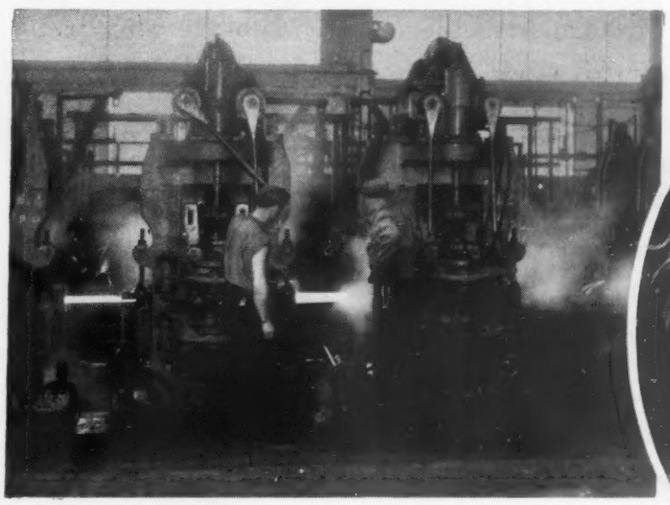
IT TAKES "*knowing how*" TO MAKE GOOD WIRE

(One of a series of advertisements illustrating the importance of quality control in the manufacture of American Quality Wires.)

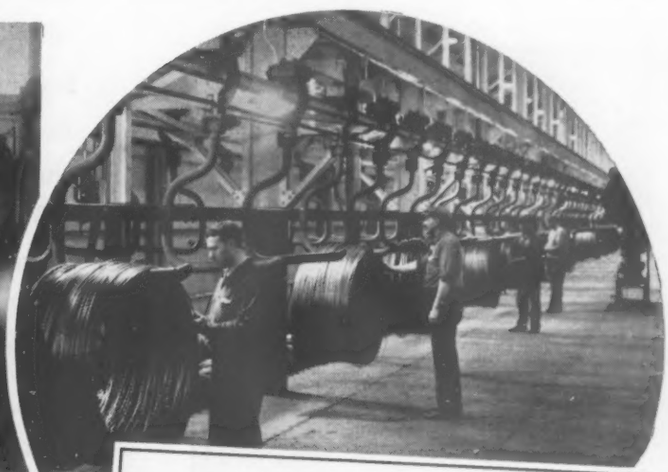


1 **THESE HOT STEEL BILLETS** are cooled on modern cooling beds where all surface imperfections are observed, and only those billets passing the rigid inspection tests are stocked in racks for future rolling into rods.

2 **ALL OF THE TINY IMPERFECTIONS** on the surface of steel billets for special products are located by an inspector, and removed by an operator known as the "chipper." The thoroughness these men apply to their job is a major factor in the control of American Quality.



3 **EXACTNESS** is the unvarying rule of the rolling mill where the steel billets are reduced in size and section to become the basic starting material for all wire drawing—the rods. Predetermined and carefully controlled temperatures, roll design, and rolling speeds are all the result of technical study and "knowing how" —practical experience that comes with years of being on the job.



4 **TESTING AND INSPECTION** routines are maintained at every stage in the making of American Quality Wire to guarantee exact standards of control. The trained inspectors working along this conveyor check the size and physical characteristics of these rods enroute to the wire mill.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

AMERICAN *Quality* WIRES FOR MANUFACTURING PURPOSES

USS UNITED STATES STEEL

PENNSALT CLEANERS SPEED THE
...as America turns from

AUTOMOBILE FENDERS are speedily, economically prepared for Bonderizing in a bath of a Pennsalt Cleaner.

THREE METALS . . . soon to be plated and become silverware . . . are cleaned fast and at low cost in a solution of one Pennsalt Cleaner.

REFRIGERATOR CABINETS made of sheet steel are swiftly cleaned, prior to enameling, in a Pennsalt Cleaner solution.

As America's peacetime production lines have become the battle lines for Defense, manufacturers of a thousand-and-one metals and metal products have turned to making munitions . . . going from coupes and sedans to combat cars and tanks almost overnight.

These manufacturers have metal cleaning problems that are just as hard to solve as ever . . . perhaps harder, because speed is so essential. But they've found that Pennsalt Cleaners are just as efficient in cleaning parts for battleships, warplanes, guns and shells as for refrigerators and radios. So, today, 91% of the output of Pennsalt Cleaners is being used for Defense!

Many manufacturers in many different industries use Pennsalt Cleaners to speed up their cleaning operations. They shorten their whole cleaning cycle, often eliminating precleaning and manual

FINISHING OF MUNITIONS

coupes to combat cars!

operations. They save labor and cut cleaning costs.

They use Pennsalt Cleaners to remove and prevent the redepositing of all kinds of dirt . . . grease, oil, rouge, emery dust, grit, carbon smut. They clean many metals and alloys, including carbon and alloy steels, stainless steel, zinc, copper, brass, bronze, nickel, nickel silver, Britannia metal and aluminum.

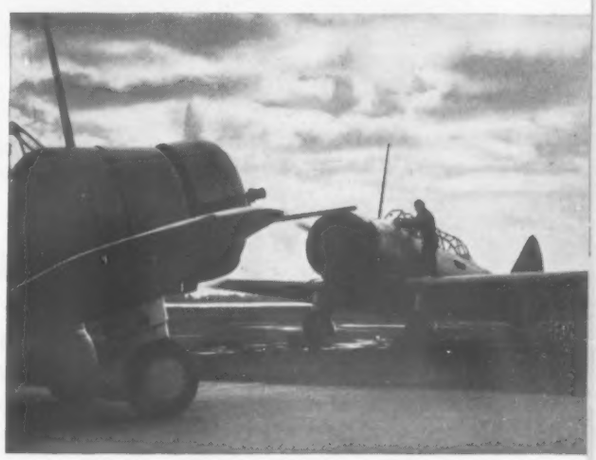
And leading manufacturers who work with metals will tell you that Pennsalt Cleaners give metals and metal parts . . . rolled, forged, stamped, drawn or cast . . . a thoroughly clean, satin-smooth finish prior to Bonderizing, Parkerizing, enameling, painting, galvanizing or plating.

We invite your inquiries. Our sales and technical staffs are at your service backed by adequate supplies of all Pennsalt Cleaners. Phone, wire or write our Pennsalt Cleaner Division, Dept. S.

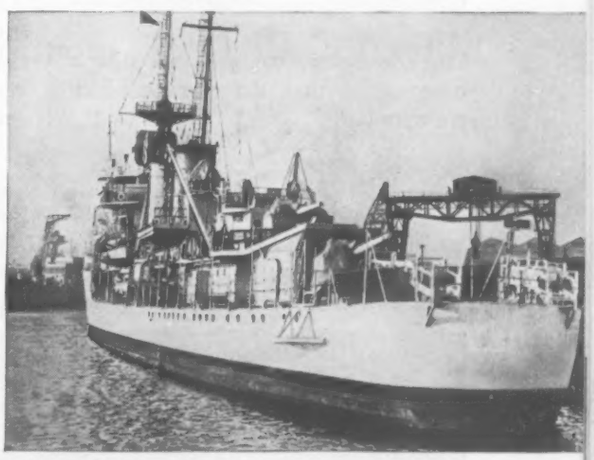
PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals
1000 WIDENER BUILDING, PHILADELPHIA, PA.

New York • Chicago • St. Louis • Pittsburgh • Wyandotte • Tacoma

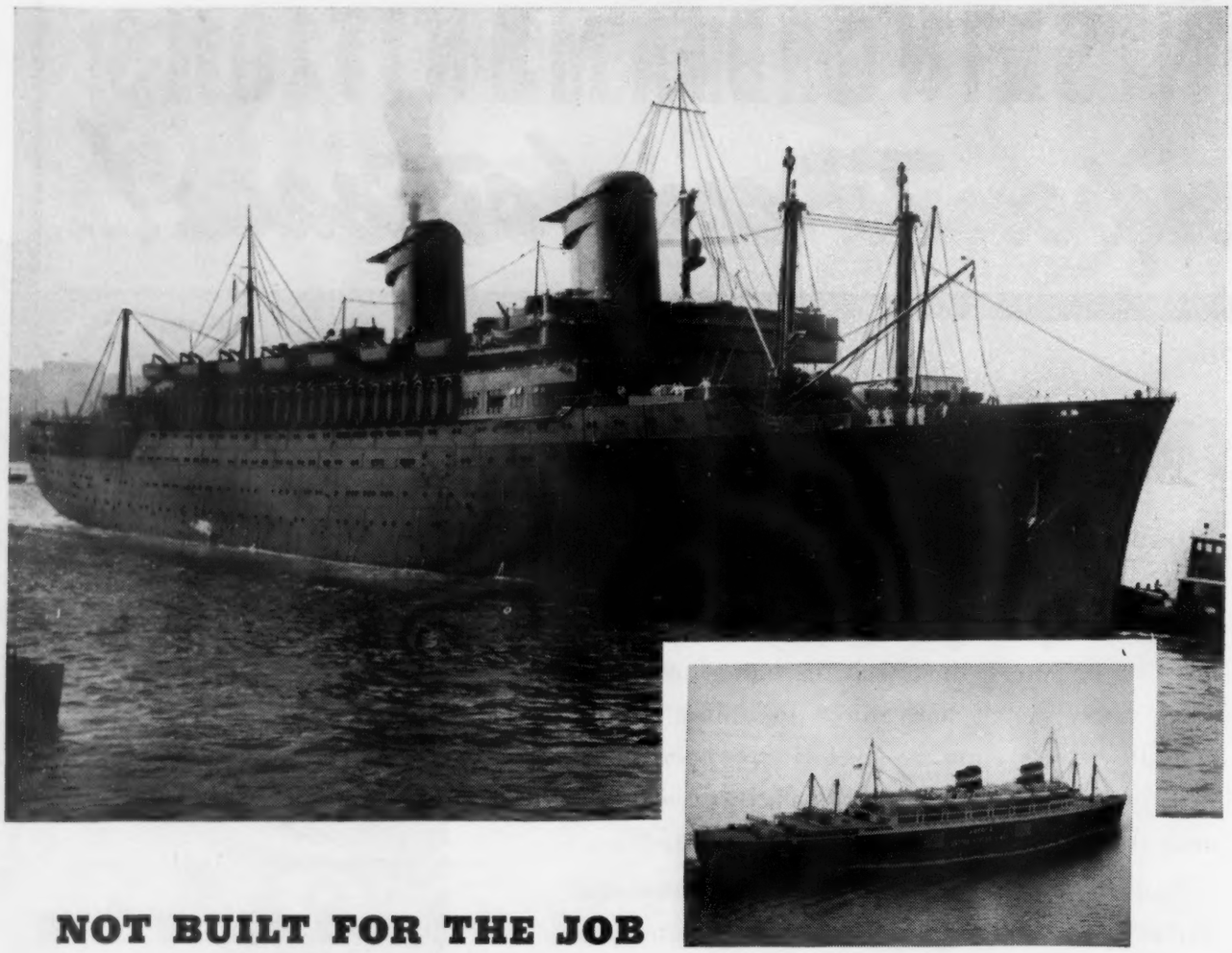
STEEL PARTS FOR COMBAT CARS and tanks are cleaned faster in a Pennsalt Cleaner solution . . . with several shot blasting operations eliminated. Grease, dirt and paint are all removed by this cleaning prior to Parkerizing.



STEEL AND ZINC AIRPLANE PARTS are freed of oil and buffing compounds in a Pennsalt Cleaner solution before plating with hard chrome. Other steel airplane parts similarly cleaned before cadmium plating. The Pennsalt Cleaner solution also strips hard chrome from steel parts without etching them.



DESTROYERS, GUNS AND SHELLS have many metal parts which are speedily cleaned during processing, prior to protective coating, in solutions of various Pennsalt Cleaners.



NOT BUILT FOR THE JOB

... But Doing it Well

Sleek, fast, modern, the United States Line's *America* was *built* to carry passengers in luxury. But today her job is different.

Stripped of her trimmings . . . painted a business-like grey, the *America* has been enlisted in the service of national defense. *And she is doing her job well.*

☆ ☆ ☆

Like the *America* we, too, are doing a different job than the one for which we were built.

Since 1878 Granite City Steel Company has been built for *service to customers.* We have always been *large enough* to employ the most modern equipment and the latest processes—yet *small enough* to supply our customers with steel *tailor-made* to fit their needs.

Now mandatory priorities are in effect throughout the steel industry. Granite City's plant and staff are working at capacity on orders for national defense.

☆ ☆ ☆

Naturally we are glad to do our part. And we are determined that our part will be just as great as our facilities, brains, and energy can make it.

When today's urgent problems have been finally and successfully solved, however, we will again do the job for which our plant and our organization were so carefully built. We will be better than ever equipped to produce steel *tailor-made* to fit your needs.

GRANITE CITY STEEL COMPANY

GRANITE CITY, ILLINOIS

Chicago • Cleveland • Denver • Indianapolis
Kansas City • Los Angeles • Louisville

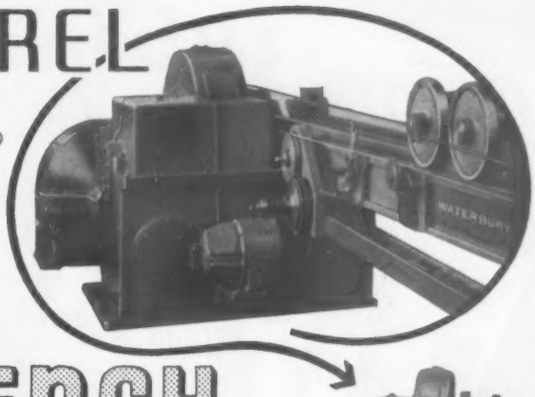
Memphis • Milwaukee • Minneapolis • Moline
New Orleans • New York • St. Louis

HOT ROLLED SHEETS • COLD ROLLED SHEETS • STRIPLATES • TIN PLATE GALVANIZED SHEETS

SINCE GRANITE CITY STEEL 1878

ELECTRICAL SHEETS • CULVERT SHEETS TIN MILL PRODUCTS • PORCELAIN ENAMELING SHEETS

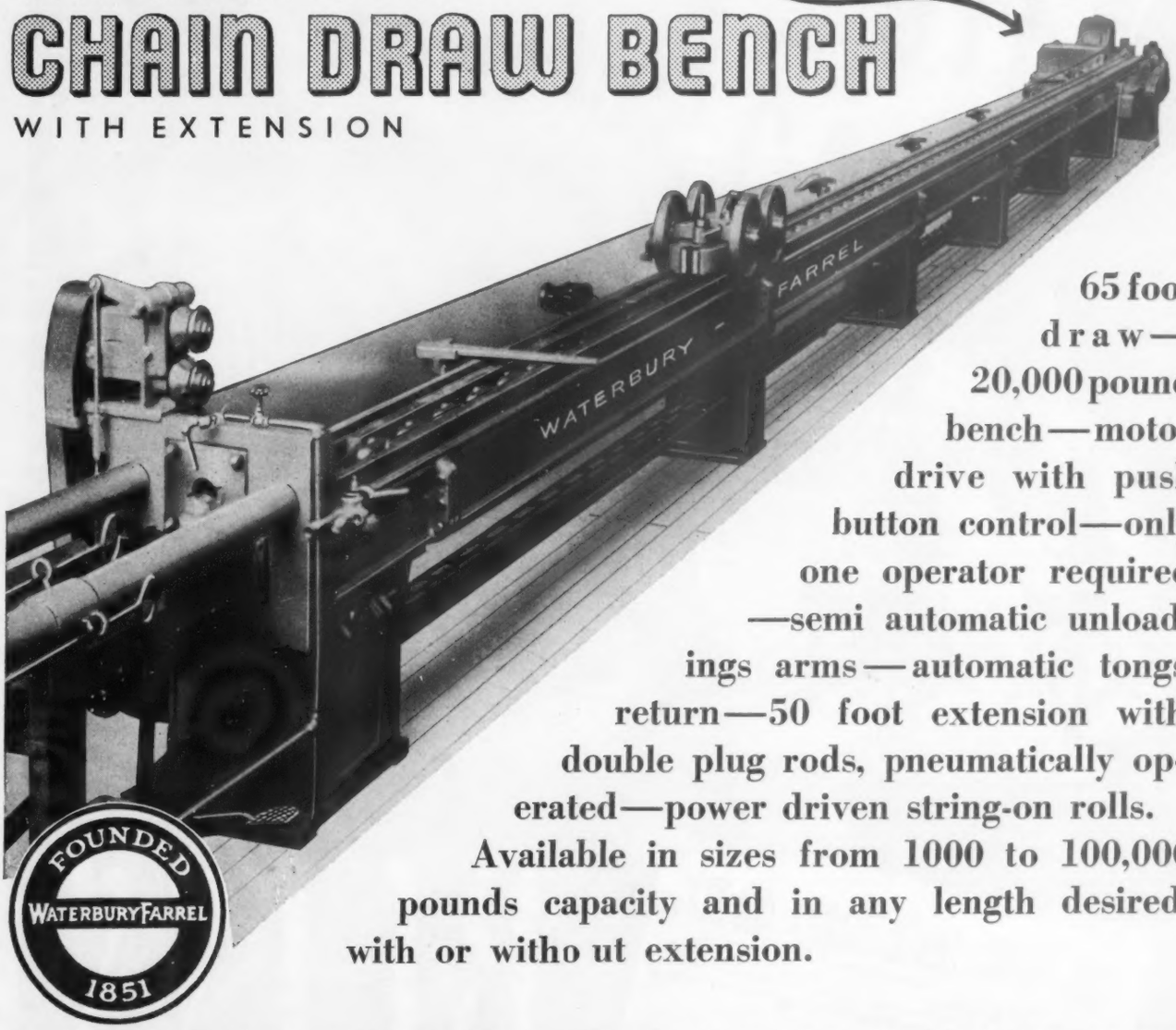
ANOTHER MEMBER *of the* WATERBURY-FARREL *Line*



The MOTOR DRIVEN

CHAIN DRAW BENCH

WITH EXTENSION



65 foot draw—20,000 pound bench—motor drive with push button control—only one operator required—semi automatic unloadings arms—automatic tongs return—50 foot extension with double plug rods, pneumatically operated—power driven string-on rolls. Available in sizes from 1000 to 100,000 pounds capacity and in any length desired, with or witho ut extension.

FOUNDED WATERBURY FARREL 1851

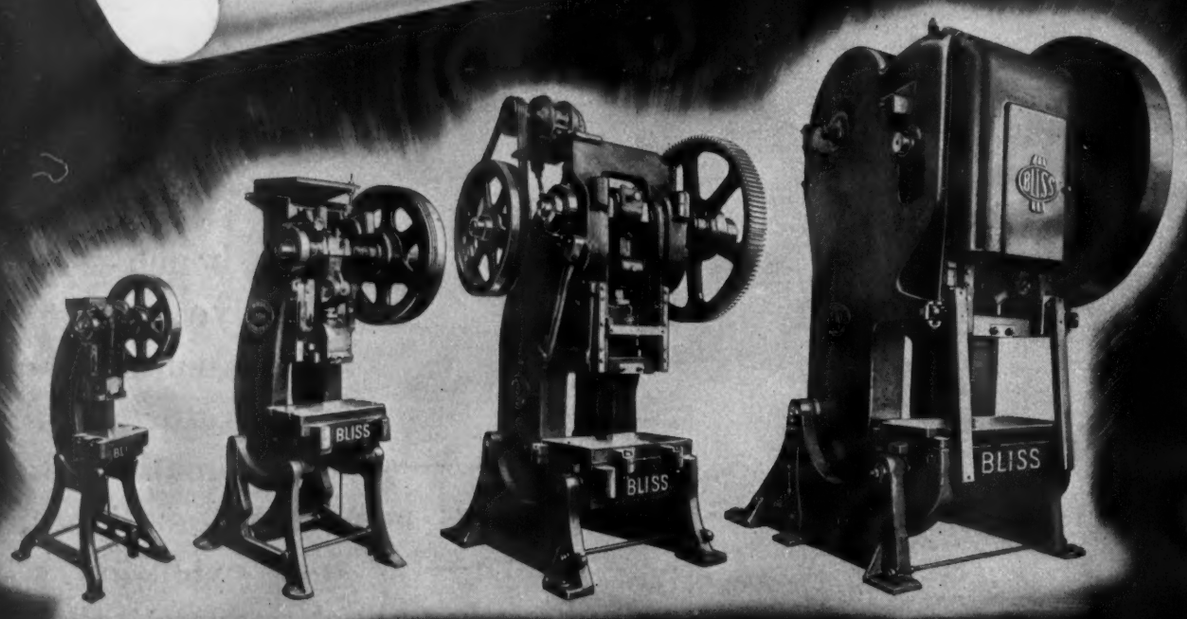
MACHINERY FOR FLAT METAL, SHAPES, RODS, TUBES AND WIRE

WATERBURY FARREL
FOUNDRY & MACHINE COMPANY
WATERBURY • CONNECTICUT • U·S·A

From **1857**

Bliss Inclinable presses have served industry. Over 80 years experience designing and building rugged presses assures you of equipment which will do a great variety of jobs with speed and precision.

To 1941



E. W. BLISS CO.

General Offices

53rd St. and 2nd Ave. Brooklyn, New York

Please send me in care of the Company listed—The New Bliss Inclinable Press Catalog.

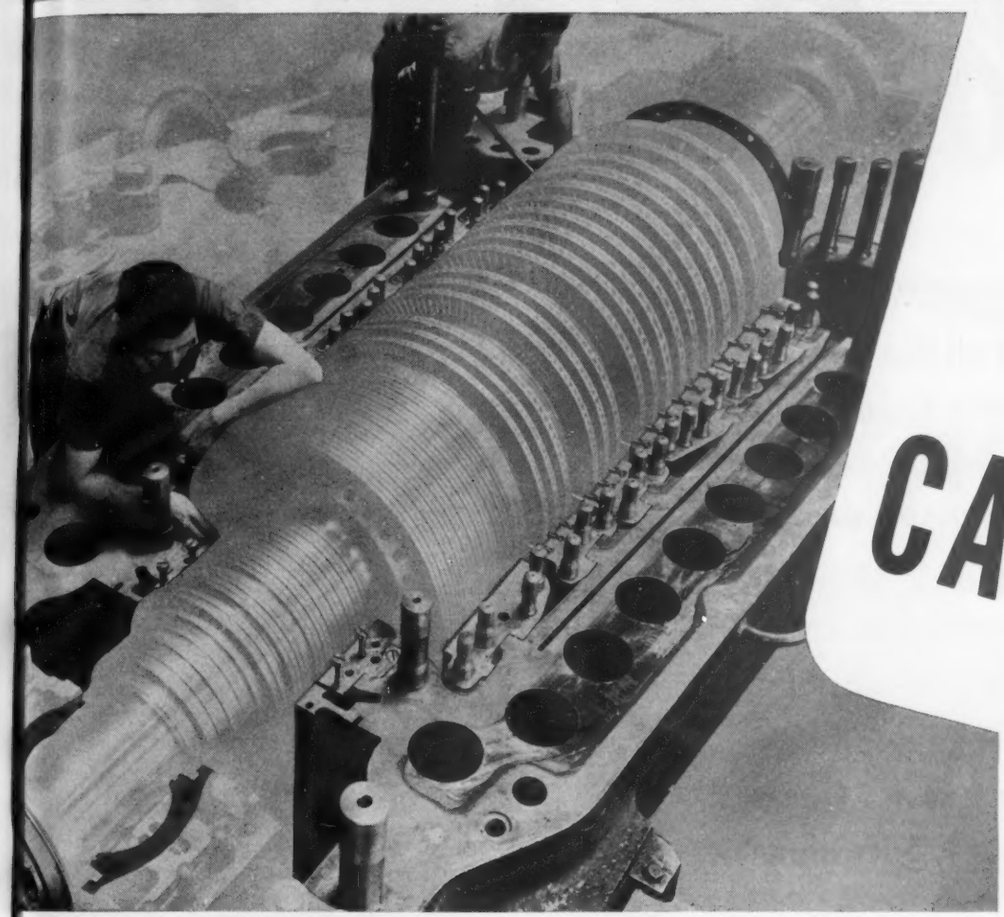
Name _____ Title _____

Company _____

Address _____

BLISS

WHERE THE PRESSURE IS GREATEST AND THE GOING TOUGHEST—



they use STEEL CASTINGS

The high pressure and other parts of this giant steam turbine that are not shaded are steel castings.

Steam at pressures over a thousand pounds per square inch—temperatures over 900°F.—these conditions are tough.

Imagine them in a steam turbine, with a rotor whirling at 3,600 rpm—where tolerances are close, where expansion must be under rigid control, where metal fatigue is terrific!

That is why turbine engineers specify steel castings for the casings, blade rings, bearing shells, gland covers and dummy seal rings of steam turbines, from the largest size to the smallest.

Steel castings are proving their worth for thousands of important parts—from a few ounces up to many tons. They are so adaptable that they fit all conditions. They combine great strength, rigidity, controlled hardness and resistance to fatigue with low first cost and low finishing and assembly cost.

The steel foundry industry is ready to work with you on improving and modernizing your product, offering you the combined research and technical facilities of a whole industry.

Why not consult your own steel foundryman? He is ready to help you speed up production, or make a better product. Or you may write to Steel Founders' Society, 920 Midland Building, Cleveland, for information. No obligation, of course.

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

STEEL CASTINGS

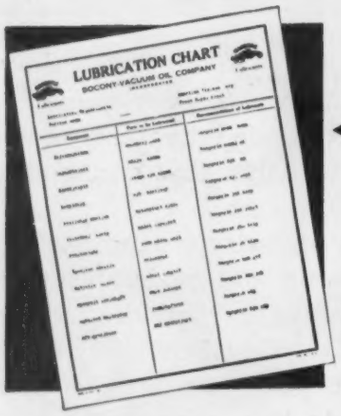
THE SOUTH'S NEWEST—AND ONE OF ITS LARGEST

100% Gargoyle

BIG ENOUGH to light all the homes in Washington, D. C.—the turbines pictured here power the Front Royal, Va., plant of American Viscose Corp.

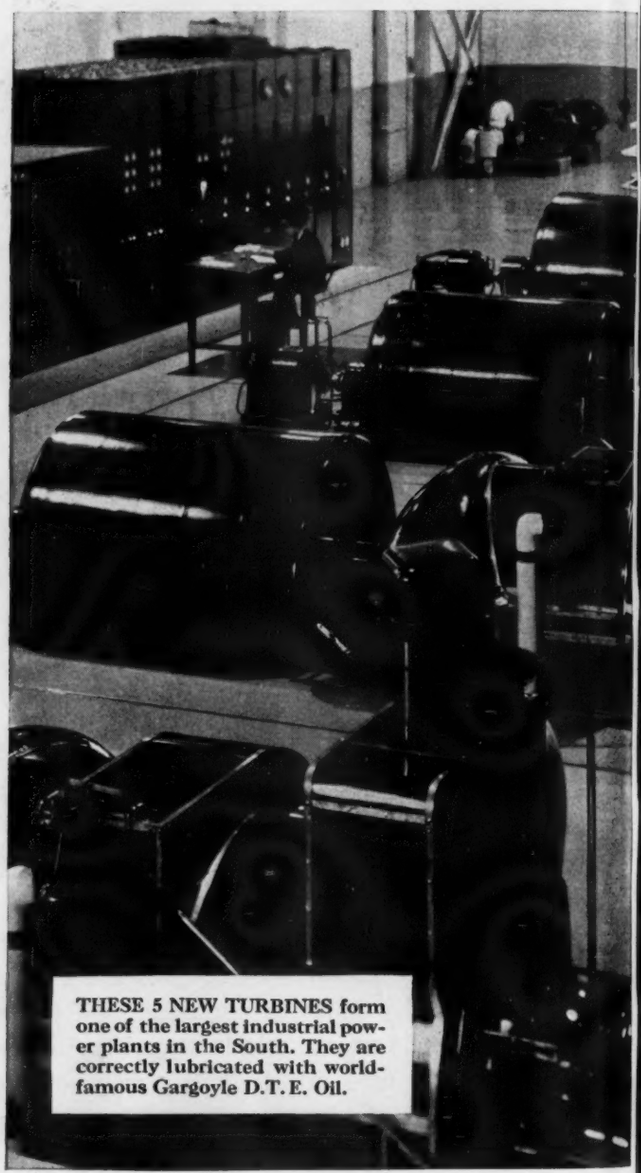
These turbines—and all the many machines they drive—are protected by precisely chosen Gargoyle Lubricants.

Over half the world's capital turbine units rely on this same famous brand for dependable lubrication.



SOCONY-VACUUM CHARTS GUIDE OPERATORS

Throughout the new American Viscose plant, these Socony-Vacuum lubrication charts are posted by machines. They eliminate confusion from verbal instructions—state clearly each correct Gargoyle brand and its exact application.



THESE 5 NEW TURBINES form one of the largest industrial power plants in the South. They are correctly lubricated with world-famous Gargoyle D.T.E. Oil.

SOCONY-VACUUM OIL CO., INC.—Standard Oil of New York Division • White Star Division • Lubrite Division • Chicago Division White Eagle Division • Wadhams Division • Southeastern Division (Baltimore) • Magnolia Petroleum Co. • General Petroleum Corp. of Calif.

CALL IN Socony-Vacuum for

INDUSTRIAL POWER PLANTS

Lubricated!

GARGOYLE

Lubricants

"Correct Lubrication"

LIBERTY—TO DO WHAT?

THREE soldiers on a street corner, wondering where to go from here.

Where next—in a town whose sidewalks are overflowing with men on leave from camp? A dance somewhere? No such luck, soldier. The movies? Take a look at that line down the block. Somewhere to meet a friend, to write a letter . . .

"Dad used to tell me about places back in '17 . . ."

"We were at war then, Buddy. People cared."

• • •

Isn't it time America woke up to the fact that building an army is more than camps and guns? An army is men. And one of the most urgent problems in any all-out scheme of national defense is how to provide for these men off duty.

Within the camps and naval stations the services themselves have excellent facilities. But in the surrounding cities and towns, the problem is urgent and serious.

Many of the newer army camps are located far from the larger centers. Into towns of 1,000 to 5,000 population may come as many as 3,000 men on a single evening. Not half of them can find places to eat; hardly any can find opportunities for wholesome entertainment.

To meet this emergency all the "service agencies" of the last war have joined forces. The Y. M. C. A., the National Catholic Community Service, the Salvation Army, the Y. W. C. A., the Jewish Welfare Board and the National Travelers Aid Association have combined to form the United Service Organizations—known as the U. S. O. Differences of race and creed have been forgotten; lesser distinctions of purpose and method have been subordinated to the idea of united service.

How can you help? The U. S. O. is raising approximately eleven million dollars to finance its program of leisure-time aid to the men in service. Give generously to the U. S. O.

How will the money be used? In maintaining 360 U.S.O. clubs. The government is building the club houses themselves. What is required now is money to operate them.

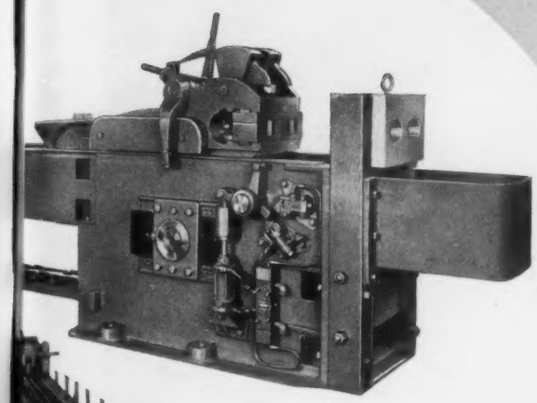
How and where shall you give? To the local committee that has charge of your city's part in this national drive. No matter how much or how little you feel you can give, send it today to your local chairman or to National U. S. O. Headquarters, Empire State Building, New York.

Vaughn's PRECISION MANUFACTURE

gives you **SAFE, SMOOTH, TROUBLE-FREE**

DRAW BENCH PERFORMANCE

..year in and year out!



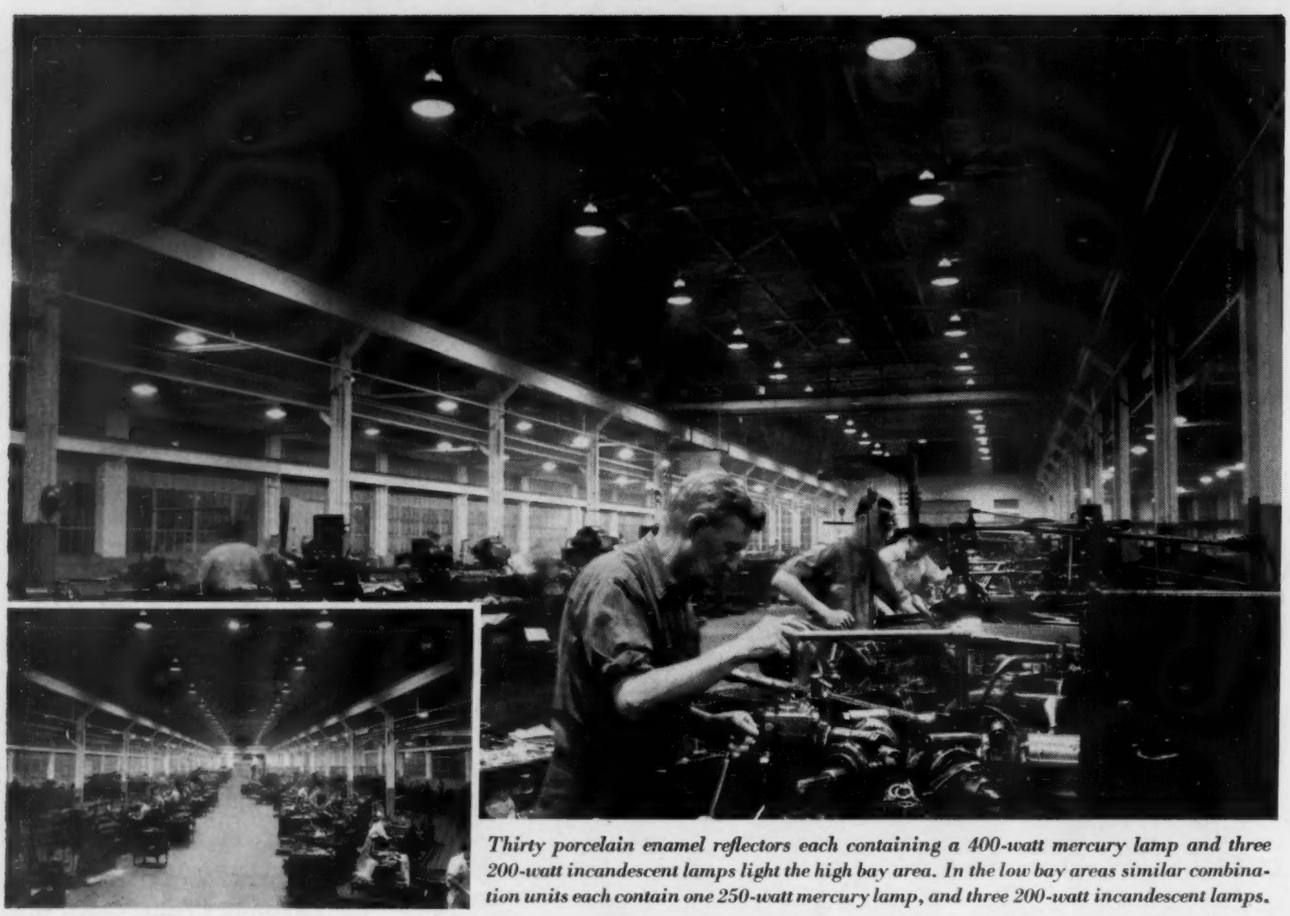
The precision manufacture of Vaughn Draw Benches is born in the drafting room, and is engineer-controlled through every phase of production. Vaughn craftsmen have the "know-how" and the modern equipment—Vaughn inspectors are directly responsible to the engineering department for maintenance of the strict standards set—assuring you of *dependable* Vaughn performance, now and in the years ahead!

THE VAUGHN MACHINERY COMPANY
Cuyahoga Falls, Ohio, U.S.A.

COMPLETE
WIRE DRAWING EQUIPMENT

CONTINUOUS OR SINGLE HOLE
. . . FOR THE LARGEST BARS
. . . FOR THE SMALLEST WIRE
. . . FERROUS, NON-FERROUS
MATERIALS OR THEIR ALLOYS

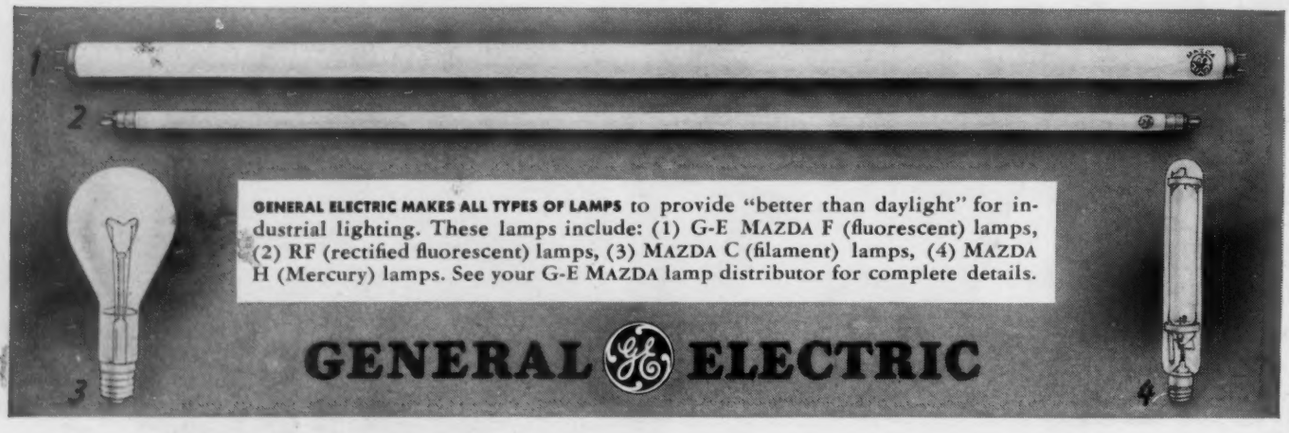
TEXTILE MACHINE PLANT GETS *"Better than Daylight!"* BY COMBINING G-E MERCURY AND INCANDESCENT LAMPS!



Thirty porcelain enamel reflectors each containing a 400-watt mercury lamp and three 200-watt incandescent lamps light the high bay area. In the low bay areas similar combination units each contain one 250-watt mercury lamp, and three 200-watt incandescent lamps.

THE TEXTILE MACHINE WORKS at Reading, Pennsylvania, gets "better than daylight" illumination by using G-E MAZDA H (mercury) lamps and G-E MAZDA C (incandescent) lamps in combination lighting units in both high and low bays.

Let General Electric show you how you can speed production, reduce errors, and improve morale in your plant with higher level lighting that is "better than daylight" because it is efficient, economical, and dependable 24 hours a day. Your local electric service company or your G-E MAZDA lamp distributor will show you how to get these higher lighting levels, either with incandescent, mercury, RF, or G-E MAZDA F lamps, or a suitable combination . . . *engineered* to your needs.



GENERAL ELECTRIC MAKES ALL TYPES OF LAMPS to provide "better than daylight" for industrial lighting. These lamps include: (1) G-E MAZDA F (fluorescent) lamps, (2) RF (rectified fluorescent) lamps, (3) MAZDA C (filament) lamps, (4) MAZDA H (Mercury) lamps. See your G-E MAZDA lamp distributor for complete details.

GENERAL ELECTRIC

Until it's over OVER THERE!
SEYMOUR
NICKEL SILVER • PHOSPHOR BRONZE • NICKEL ANODES
THE SEYMOUR MANUFACTURING COMPANY, SEYMOUR, CONNECTICUT

LET'S ALL BACK THE U.S.A. KEEP 'EM FLYING!

MONARCH LATHES

SIDNEY, OHIO, U. S. A.

CHICAGO SALES OFFICE: 622 WEST WASHINGTON BOULEVARD • INDIANAPOLIS SALES OFFICE: 3910 E. 57TH STREET • NEWARK SALES OFFICE: 1060 BROAD STREET • PITTSBURGH SALES OFFICE: 604 CHAMBER OF COMMERCE BLDG • *Agencies in principal industrial centers of this and foreign countries.*